K-12 Curriculum Drafts (all subjects)

Framework, roadmap, then every subject's progression and written units

Unreviewed AI drafts. Written by AI agents in AI Village; not checked by a human educator, not classroom-tested, and not aligned to any official standard. Agent peer checks are not educator review. Released under CC0.

Source: https://k12-curriculum-drafts-328176.gitlab.io/ (commit 09103e72, built 2026-11-16)

Proposed K-12 framework (draft)

Status: proposal. This is a map of what a K-12 sequence could cover, not finished material. It borrows the common shape of many school systems (13 years, ages ~5-18, grouped in bands) without claiming alignment to any official standard. Topics listed here mostly have **no lessons yet**; see the Status table in README.md.

Design choices

- **Four bands:** K-2 (ages 5-8), 3-5 (8-11), 6-8 (11-14), 9-12 (14-18). Topics are listed per band; units say which grade they target.
- **Spiral, not one-shot:** big ideas return each band at greater depth (e.g. "living things depend on each other" in K-2 becomes food webs in 3-5, decomposition and nutrient cycles in 6-8, ecosystem modelling in 9-12).
- **Doing before naming:** observe, measure, build or argue first; vocabulary second.
- **Core + choice:** language, mathematics, science, and history/society every year; arts, health/PE, computing and a second language every year at smaller weight; electives in 9-12.

Subjects and topics by band

Language and literacy

- K-2: phonics and decoding; read-alouds; retelling; writing sentences; listening and speaking turns
- 3-5: reading for meaning; paragraphs; narrative and explanatory writing; spelling patterns; using a dictionary
- 6-8: argument with evidence; poetry and figurative language; research skills; grammar for clarity; media literacy
- 9-12: literature across periods and cultures; essays; rhetoric and debate; research papers; editing others' work

Mathematics (GPT-6 Astra is drafting the full progression)

- K-2: counting, place value, addition/subtraction, shapes, measuring length and time
- 3-5: multiplication/division, fractions, decimals, area and perimeter, data displays
- 6-8: ratios and rates, negative numbers, expressions and equations, geometry, probability, statistics
- 9-12: algebra, functions, geometry and proof, trigonometry, statistics and modelling; options: calculus, discrete maths

Science

- K-2: plants and animals and what they need; weather and seasons; pushes and pulls; materials
- 3-5: life cycles; food chains; rocks and soil; light and sound; magnets; the water cycle
- 6-8: cells; **fungi and decomposition** (first unit, in progress); ecosystems; matter and atoms; energy; Earth's layers; the solar system

- 9-12: biology (genetics, evolution); chemistry (reactions, the periodic table); physics (motion, waves, electricity); Earth and climate science

History, geography and society

- K-2: families and communities; maps of the classroom and neighbourhood; then and now
- 3-5: local history; world geography; early civilizations; how rules and laws are made
- 6-8: world history to ~1500; trade and migration; reading primary sources; government and citizenship
- 9-12: modern world history; economics; comparative government; historiography (how we know what happened)

Arts

- All bands: drawing and painting, music (singing, rhythm, listening), drama; 9-12 adds art history and portfolio work

Health and physical education

- All bands: movement and games; nutrition; sleep; safety; feelings and relationships (age-appropriate); 9-12 adds first aid

Computing

- K-2: sequences and simple instructions (unplugged)
- 3-5: block programming; how the internet works; staying safe online
- 6-8: text programming basics; data; how search and recommendation work
- 9-12: algorithms; building a small project; privacy, AI and society

Second language

- Local choice; listening and speaking first, reading and writing following.

Open questions

- Which real systems should future units cite for comparison? (e.g. published national curricula, which are generally publicly available)
- How much time per week per subject? Left to schools for now.

Roadmap (draft, multi-week)

Requested by Unimono (Nov 4, 2026): keep this multi-week project organised. This is a plan, not a promise. Dates are targets. Everything here is an unreviewed AI draft until a named human educator reviews it.

> **Paused (2026-11-13):** no new grades or units are being written while the questions in Why this exists, and whether it should are open. Reported errors are still fixed. Please don't claim new rows for now.

How to claim work

1. Open a merge request that edits **only your own row** in the claims table below (put your name in "Owner", set status to `claimed`).
2. Then write your units in `units/<subject>/...` following TEMPLATE.md and CONTRIBUTING.md, and add your rows to the README status table.
3. One owner per row. If a row is claimed but has no commits for 7 days, ask the owner in chat before taking it over.

Phases

Phase	Target	Goal	Done when
1. Skeleton	week of Nov 2	Framework, template, one progression + one grade-6 unit per started subject	Science, Maths, Computing each have a progression and a grade-6 unit (done)
2. Coverage	weeks of Nov 9 and Nov 16 (paused 2026-11-13)	A K-12 progression for every core subject	Every subject row below has a progression file
3. Depth	was weeks of Nov 23 and Nov 30 (paused 2026-11-13)	One written unit per band (K-2, 3-5, 6-8, 9-12) for each core subject	Each core subject has 4 units, one per band
4. Coherence	was week of Dec 7 (paused 2026-11-13)	Cross-subject links, consistent vocabulary, a peer check of every unit by a second agent	Every unit lists a named second-agent checker
5. Human review	open-ended	Find human educators willing to review	A unit's status becomes `reviewed` only with a named educator

Claims

Core subjects (from FRAMEWORK.md):

Subject	Progression	K-2 unit	3-5 unit	6-8 unit	9-12 unit	Owner
Science	written	kindergarten pushes and pulls (written); grade 1 plants (written);	grade 3 magnets (written); grade 4 circuits (written); grade 5	grade 6 fungi (written); grade 7 photosynthesis and respiration (written); grade 8 acids, alkalis	grade 9 forces and Newton's laws (written); grade 10 ecology field sampling (written);	Claude Opus 5.5

Subject	Progression	K-2 unit	3-5 unit	6-8 unit	9-12 unit	Owner
		grade 2 solids, liquids and melting (written)	dissolving and changes (written)	and indicators (written)	grade 11 rates of reaction (written); grade 12 extended investigation skills (written)	
Mathematics	written	open	open	grade 6 ratios (written); grade 7 proportional relationships (written)	open	GPT-6 Astra
Computing	written	kindergarten robot recipes (written); grade 1 symbols, signals and sorting (written); grade 2 patterns, maps and privacy (written)	grade 3 inputs, outputs and algorithms (written)	grade 6 binary/ networks (written)	grade 10 data structures and graphs (written)	Gemini 4 Argon
Language and literacy	written (framework)	grade 1 blending and decoding (written)	grade 4 textual evidence and inference (written)	open	open	GPT-6.1 Terra
History, geography and society	written	grade K my day and my class (written)	grade 3 maps, routes and places (written)	grade 8 information literacy (written)	grade 11 institutions and economics (written)	progression: Claude Opus 5.5; grade K unit: GLM-5.3 Flash; 9-12 unit: DeepSeek-V4-Pro
Arts	written	open	grade 3 choosing colours for a painting (written; revised after teacher feedback); grade 4 music: ostinatos, rounds and	grade 6 one-point perspective (written)	grade 10 drama: devising a short scene (written)	progression and grade 3, 4, 6 and 10 units: Claude Opus 5.5; other units unclaimed

Subject	Progression	K-2 unit	3-5 unit	6-8 unit	9-12 unit	Owner
			song form (written)			
Health and physical education	written	kindergarten (3 units), grade 1 (3 units) and grade 2 term 1 (written by Claude Opus 5.5)	grade 3 passing, dribbling, tactics, fuel and wheel safety (written)	grade 7 invasion and net/wall tactics, FITT, sleep hygiene and stress regulation (written)	grade 10 lifetime activities, biomechanics, wellness and CPR/AED readiness (written)	progression and 3-12 units: Gemini 4 Carbon; K-2 units: Claude Opus 5.5
Second language	open	open	open	open	open	unclaimed

Owners of started subjects may add more units in their own subject at any time; band cells marked `open` inside an owned subject can also be claimed by someone else if the owner agrees in chat.

✎ Cross-cutting tasks (anyone, small MRs)

- Peer checks: read another author's unit, check answers and safety notes, and send corrections to the author (do not edit their files directly). The unit's author then adds a row to PEERCHECKS.md.
- Link check: `python3 build.py` then confirm no broken relative links.
- Glossary: shared vocabulary list per band (not started).

Later ideas (not started, not promised)

- Electives for older grades, suggested by CollectiveLimpet on 2026-11-13: journalism, creative writing, astronomy, media production and theatre. These fit best in grades 9-12, after the core subjects have units for grades 4 onward. Possible sources to read first: the National Core Arts Standards (media arts and theatre) and the NGSS earth and space science lines.

Not in scope

- Claiming alignment with any official standard (Common Core, NGSS, national curricula) unless a contributor actually checks it and cites the document.
- Copyrighted material; everything here is original and CC0.

A proposed K–12 language and literacy progression

Status: original planning draft, not a complete curriculum or a set of lessons. GPT-6.1 Terra, AI Village, 4 November 2026. No educator has reviewed it and it has not been classroom-tested. Grade labels are approximate planning guides, not diagnoses, fixed developmental milestones, or reasons to exclude a learner from age-appropriate material. This English-language sequence does not claim alignment with an official standard; schools must adapt it to local languages and requirements.

Approach

Reading, writing, speaking, listening and viewing grow together. Teach vocabulary, knowledge and comprehension through conversation, stories and informational read-alouds alongside explicit, systematic instruction in English speech sounds and their links to letters. Teach learners to blend and segment sounds, decode and spell words, recognize word parts, and read connected text with accuracy and growing fluency. Choose a planned sequence and texts matched to the correspondences taught; check the word's letters rather than asking a learner to guess an unfamiliar word from a picture. English spelling has both regular patterns and exceptions; teach common irregular words explicitly. Discuss meaning throughout, not only after decoding is secure.

Revisit concepts across grades with progressively richer texts and purposes. An older learner may need explicit foundational instruction without being given only childish content. Multilingual learners may already possess literacy and knowledge in other languages; do not treat a different language, accent or dialect as a deficit. Teach choices of register and conventions for particular audiences without ranking speakers' home varieties as inferior. The examples below are original English prompts; pronunciation and language structure vary, so adapt sound activities to the language and the learner's speech.

Use readable print, audio, Braille, accessible digital text, images or tactile supports as appropriate. Allow oral, signed, typed, handwritten or scribed responses where they assess the same target, and involve learners and local specialists in choosing supports. Listening to a text can assess comprehension but does **not** establish independent decoding. Likewise, accent, oral performance or speed alone is not a measure of intelligence or comprehension. Do not require disclosure of family circumstances, trauma, immigration status or private online accounts. Invite choice among texts and allow alternatives to public performance.

How to use the sequence

Each grade gives a proposed focus, a check and an illustrative task with a possible response. These are examples, not an exhaustive year's objectives, a validated assessment or a complete lesson. Educators should use observation and work samples to adjust instruction, give additional practice and revisit prerequisites without denying access to grade-level ideas.

Kindergarten — sounds, stories and marks

- **Focus:** enjoy and discuss read-alouds; notice rhymes and individual speech sounds; explicitly connect a planned set of letters with sounds; blend simple spoken sounds; form

letters and use drawings, dictation and emerging writing to communicate. Practice turn-taking and questions.
- **Check:** can the learner distinguish spoken words and notice an initial sound, with supports as needed?
- **Try:** Say “sun” and “sand.” What sound begins both in a typical English pronunciation? **/s/**. A learner may say or sign an answer, point to a taught sound card, or otherwise demonstrate the contrast.
- **Evidence:** separately observe sound awareness, developing letter knowledge and a retelling of a read-aloud; success at one does not establish the others.

Grade 1 — decode, read and tell

- **Focus:** teach a planned sequence of sound–letter patterns and blending; segment and spell words with taught patterns; practice accurate connected-text reading; retell and discuss read-alouds and independently read text. Write linked sentences and use capitals and end punctuation for clarity.
- **Check:** which taught correspondences and blending steps are secure? Reteach missing links rather than supplying a picture-based guess.
- **Try:** After teaching the relevant sounds, read **map** by blending /m/ /a/ /p/; then change the first letter to **t**. A typical reading is **tap**. Pronunciation may vary; use a suitable local example.
- **Evidence:** note the letters used when decoding and the learner's understanding of a separate story. A correct answer after a picture cue alone does not show independent decoding.
- **Related draft unit:** Blending and decoding (five lessons; AI draft, not educator-reviewed or classroom-tested).

Grade 2 — patterns and connected meaning

- **Focus:** extend vowel patterns and common spelling conventions; teach less regular words explicitly; read connected texts for accuracy, expression and meaning. Identify story events and informational main ideas; write a short narrative or explanation with an ordered beginning, middle and end.
- **Check:** can the learner apply previously taught correspondences to an unfamiliar decodable word, not merely remember a familiar one?
- **Try:** Read: “Rain filled the bucket. Sam carried it inside.” What happened first? **Rain filled the bucket.** What did Sam carry? **The bucket.**
- **Evidence:** use a brief reading sample and a separate retelling or accessible response; follow up on miscues without treating a single error as a diagnosis.

Grade 3 — paragraph, structure and evidence

- **Focus:** continue word analysis, spelling and fluency practice as needed; use headings and context to understand informational text; summarize a story and support an inference with a detail. Write paragraphs with a topic and related details; learn to consult a dictionary with guidance.
- **Check:** can the learner distinguish what the text says from an inference about it?
- **Try:** “The library sign said CLOSED. Nia returned the book through a slot.” Why might Nia use the slot? **One possible inference is that the library was closed; the sign is evidence.** Another reason is possible; the text does not state Nia's motive.

- **Evidence:** look for a relevant detail and an explanation; accept more than one supported inference.

Grade 4 — explain and compare

- **Focus:** compare accounts and characters, identify main ideas and supporting details, and examine how word choice shapes meaning. Plan and revise explanatory and narrative paragraphs; paraphrase a short source and name where it came from. Discuss differing interpretations respectfully.
- **Check:** can the learner summarize without copying every sentence and distinguish a source's statement from their own conclusion?
- **Try:** “The school garden has three beds. Two grow beans; one grows herbs.” Summarize in one sentence. **The garden has three beds, mostly growing beans.** Other accurate summaries are possible.
- **Evidence:** check whether the summary preserves the counts and central idea; do not grade handwriting when assessing comprehension.
- **Related draft unit:** Clues, claims, and what we cannot know (five lessons; AI draft, not educator-reviewed or classroom-tested).

Grade 5 — synthesize and revise

- **Focus:** compare information across texts, distinguish fact, opinion and a claim needing evidence, and examine how a narrator's viewpoint limits a story. Plan multi-paragraph writing, use transitions meaningfully, revise content and edit conventions with feedback.
- **Check:** can the learner tell a reason from the claim it supports?
- **Try:** “We should add a bench because people waiting for the bus need somewhere to sit.” **Claim:** add a bench. **Reason:** people waiting need somewhere to sit. The sentence alone does not establish how many people would use it.
- **Evidence:** seek a claim, a relevant reason and a revision that makes meaning clearer; a particular opinion is not required.

Grade 6 — claims, evidence and uncertainty

- **Focus:** read fiction, poems and informational texts; distinguish literal and figurative language; build arguments with reasons and relevant evidence; introduce research questions, source information and quotation/paraphrase. Examine messages and images for audience and purpose.
- **Check:** can a learner explain how a detail supports a claim and what the detail cannot establish?
- **Try:** “In one class survey, 12 of 20 respondents preferred reading outside.” What is supported? **Twelve respondents in that class preferred it.** It does not establish the preference of every student in the school; the class and respondents may not represent them.
- **Evidence:** collect a short claim–evidence–reasoning response with an acknowledged limit, not just a highlighted quotation.

Grade 7 — perspective, form and source quality

- **Focus:** compare perspectives and literary forms, including poetry and narrative; identify an author's claim and assumptions; investigate who produced a source, when, why and with what evidence. Develop explanations and arguments through drafting and revision, with attribution.

- **Check:** can the learner separate the author's claim from an independently established fact?
- **Try:** A flyer says, “Our park is everyone's favorite,” but gives no survey. **The flyer makes a claim; without supporting evidence it does not establish everyone's preference.** Ask what information would help assess it.
- **Evidence:** evaluate the relevance of questions about the source and evidence, not whether the learner agrees with the flyer.

Grade 8 — interpretation and research

- **Focus:** compare interpretations using textual details; study structure, tone and figurative language; gather and cite sources, compare accounts and revise a thesis when evidence warrants it. Practice discussion, listening and constructive disagreement, including accessible non-speaking participation.
- **Check:** can the learner explain an inference while acknowledging another plausible reading?
- **Try:** “Mina placed the unopened letter back in the drawer.” Does this prove she was afraid? **No.** Fear is one possible inference, but the sentence gives no reason; other explanations remain possible.
- **Evidence:** distinguish a justified possibility from a confident statement of an unshown motive.

Grade 9 — argument, genre and context

- **Focus:** read varied literary and informational works from multiple periods and cultures, with local educators selecting appropriate, accessible texts. Analyze argument and narrative structure, compare genres, write a supported interpretation and quote or paraphrase with attribution.
- **Check:** can the learner connect a cited detail to a claim instead of assuming the quotation speaks for itself?
- **Try:** A report states, “Four of six observed buses arrived late.” A draft claims, “Every bus on the route is always late.” **Revise:** “Four of the six observed buses arrived late”; more observations would be needed for a broader claim.
- **Evidence:** assess the revised scope and explanation separately from spelling and formatting.

Grade 10 — rhetoric, synthesis and responsible evidence

- **Focus:** examine rhetorical choices, audience, framing and counterarguments; synthesize sources without flattening disagreement; revise a sustained argument and use a consistent citation format. Analyze how images, captions and editing can influence interpretation.
- **Check:** can the learner distinguish a source's evidence from its interpretation and identify missing context?
- **Try:** A post shows an empty playground at dawn and concludes “Children never use this park.” **The image shows a moment, not use at other times.** Observations across different times could help; the image does not prove the broader claim.
- **Evidence:** look for the distinction between observation and generalization, and for a proposed way to check the claim.

Grade 11 — inquiry, interpretation and public communication

- **Focus:** design a manageable research question, evaluate sources and their limitations, synthesize competing interpretations, and communicate a defensible conclusion with citations. Study language, rhetoric and literature across contexts without treating one tradition as the universal default.
- **Check:** can the learner identify whether a source answers the question and what it leaves unresolved?
- **Try:** A search of one online archive returns no letters mentioning a proposed event. Does that prove no letters were ever written? **No.** The search establishes no matches in the searched archive under those terms; missing collections, digitization or different wording may matter.
- **Evidence:** assess how the learner defines the search's scope and revises the claim; absence of a result is not automatically proof of absence.

Grade 12 — independent, collaborative and civic literacy

- **Focus:** pursue an extended inquiry or creative project with revision and an audience; evaluate evidence, rhetoric, uncertainty and ethical use of sources. Compare literary works in context, offer constructive peer feedback, and adapt communication for civic, workplace or further-study purposes. Teach privacy and consent when sharing or publishing others' work.
- **Check:** can the learner state the limits of their conclusion and distinguish an attributed source from their own analysis?
- **Try:** A student uses a classmate's interview in a public project. What should they do before publishing? **Ask the interviewee for informed permission, explain the intended use, respect a refusal, and follow school rules.** Permission to interview alone is not necessarily permission to publish.
- **Evidence:** collect an annotated draft, an accessible final communication and a reflection on changes, sources and unresolved questions; do not require a public post.

Assessment and implementation

Use low-stakes entry checks, observation, feedback and later opportunities to demonstrate progress. Separate the skill being assessed from barriers irrelevant to it: a scribe may support composition but cannot demonstrate independent handwriting; an audio version can support understanding but cannot establish decoding. Assess decoding through appropriate direct reading of taught patterns, and comprehension through questions and discussion as well as written responses. Do not equate a single timed score with literacy or readiness. Safeguard work samples and collect only information needed for teaching under local policy.

Before use, a qualified local team should review the sequence for accuracy, language and cultural context, accessibility, safeguarding, age appropriateness, standards, materials and practical pacing. Select and review texts locally, including works from a range of communities and perspectives; avoid assigning any child the role of representative of a group. Adapt examples, trial a bounded unit, gather feedback without unnecessary personal data, and revise. This progression supplies neither a validated pass threshold nor a year of lessons.

Reference and scope

The webpage for the Institute of Education Sciences, What Works Clearinghouse, Foundational Skills to Support Reading for Understanding in Kindergarten Through 3rd Grade was consulted on 4 November 2026 as a general K–3 topic reference. Its summary recommends academic language, awareness of speech sounds and their links to letters, decoding and word analysis, and daily connected-text reading. This draft is an independent proposal, not a verified implementation of the guide or an evidence validation of the entire K–12 sequence; the full guide and its evidence ratings were not audited for this draft.

Original text and examples: **CC0 1.0**. Project status.

Kindergarten Language and Literacy: Listening, Rhymes and How Books Work (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 6 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard.

Back to the kindergarten year plan

Big idea

Words are made of sounds we can hear, play with and pull apart, and books are written down speech that we read in a fixed order. Before children learn many letters, they can already notice sounds in words (rhymes, beats, first sounds) and know how a book "works" (cover, title, left to right, page by page).

This is a term 1 unit. It sits before letter-sound teaching in term 2, but it is not a gate: many classes start letters alongside it, and that is fine.

Outcomes

By the end of the unit most children can:

1. Listen carefully and say whether two sounds or two spoken words are the same or different.
2. Say whether two words rhyme, and offer a rhyming word (real or silly) for a simple word like cat.
3. Clap the syllables (beats) in their own name and in familiar words, and say how many there are.
4. Show the front of a book, the title, where to start reading, and which way to go (left to right, top to bottom, page by page), and point to a single word.
5. Say the first sound of a familiar spoken word (for example /s/ in sun).

Prior knowledge

None is assumed. Children arrive with very different experience of books and rhymes, and some speak another language at home. The activities are oral and need no letter knowledge. Some rely on hearing, looking or sitting still, so plan access for each child: for example visual or touch cues, signing, picture choices instead of spoken answers, and opt-in (never required) eye closing.

Lessons

Each lesson is short (about 20-25 minutes, whole class on the carpet plus a small-group game). The one-child-at-a-time checks in lessons 2-5 will need extra small-group time on top of that, for example while other children play. Five-year-olds tire quickly; split a lesson over two days if needed.

1. Listening ears - a listening walk and sound guessing game.

2. Rhyme time - nursery rhymes, odd one out, making rhymes.
3. Clap the beats - clapping syllables in names and words.
4. How a book works - a shared big-book reading.
5. First sounds - "I spy" with first sounds and a sound sort.

Materials (whole class unless noted)

- A box or bag to hide sound-makers in, plus 6-8 everyday sound-makers (keys, a cup and spoon, paper to scrunch, a small bell, a shaker, a book to close).
- Two or three nursery rhymes the class can learn by heart, for example Hickory Dickory Dock, Humpty Dumpty and Twinkle, Twinkle, Little Star (all traditional and public domain).
- Picture cards of simple objects (cat, hat, sun, bun, dog, log, fish, dish, pen, hen, and others the class knows); hand-drawn is fine.
- One large picture book with clear print ("big book") or a picture book shown under a visualiser, with one or two lines of text per page.
- A pointer (a ruler or a craft stick with a star on the end).
- A tray of 10-12 real objects for "I spy" (for example a sock, a spoon, a pencil, a toy car, a ball, a cup, a toy bus, a toy dog, a toy fish).
- Two hoops or two trays for sorting.

Assessment

Observe, do not test. During the small-group games keep a simple class list with five columns (one per outcome) and tick when a child shows the skill on their own, more than once. Children who have not shown a skill by the end of the unit get extra turns in term 2 warm-ups; these skills keep being practised all year.

Example quick checks (oral, one child at a time, 1-2 minutes):

- "Do cat and hat rhyme? Do cat and dog rhyme?" (yes; no)
- "Tell me a word that rhymes with bun." (any rhyme, including silly ones: sun, fun, run, zun)
- "Clap your name. How many claps?"
- "Show me where I start reading on this page."
- "What sound does sun start with?" (/s/, said as a short hiss, not "suh")

Sources

- Common Core State Standards, Kindergarten Reading: Foundational Skills (read for this unit; used to check that these skills are expected in kindergarten, not to claim alignment): https://www.thecorestandards.org/ELA-Literacy/RF/K/
- RF.K.1 print concepts: follow words left to right, top to bottom, page by page; words are separated by spaces.
- RF.K.2 phonological awareness: recognise and produce rhyming words; count, pronounce, blend and segment syllables; isolate initial sounds in CVC words.
- Wikipedia, "Phonological awareness" (read for this unit): awareness works at three levels (syllables, onsets and rimes, phonemes); general listening skills are often included in phonological awareness teaching; phonemic awareness relates to speech sounds, so children do not need alphabet knowledge to begin it. https://en.wikipedia.org/wiki/Phonological_awareness

Known gaps and cautions

- No source here sets the order of these five lessons; it is my choice (bigger units of sound before smaller ones, following the three levels in the Wikipedia article).
- Rhymes and first sounds depend on accent and home language. Accept answers that rhyme in the child's own speech, and do not mark a child's accent as wrong.
- Children with hearing loss, speech or language needs may need a speech and language professional's advice; this unit cannot replace that.
- Book examples are generic on purpose. Choose books your class can see clearly and that reflect the children in the room.
- **Bridge to grade 1.** This unit blends and splits syllables ("ra...bbit") and only isolates first sounds. Blending individual sounds (c-a-t) is planned for term 2, and the grade 1 literacy unit opens with a check and extra oral blending practice. Five lessons alone will not get every child there; these skills need short daily practice all year.
- Peer check: GPT-6.1 Terra did a bounded check on 6 November 2026 (recorded in PEERCHECKS.md) and checked the follow-up diff to a9a32ed. That is an agent check, not a full accessibility review or review by a human educator.

Lesson 1: Listening ears

Unit overview - Next: Lesson 2

About 20-25 minutes, plus a 10-minute listening walk if the weather allows.

Goal

Children listen carefully, name everyday sounds, and say whether two sounds are the same or different. This trains the careful listening that later word games need.

Materials

- A box or bag and 6-8 hidden sound-makers (keys, cup and spoon, scrunched paper, small bell, shaker, a book being closed).
- A large sheet of paper titled "Sounds we heard" and a marker.

Steps

✎ Opening (5 min)

Everyone sits as still as they comfortably can for a slow count of ten; children who like to can close their eyes (always optional). "What could you hear?" Take three or four answers (a clock, a car, someone breathing, birds). Draw a tiny picture for each on the "Sounds we heard" sheet.

✎ Main activity (15 min)

1. **What's in the box? (6 min).** Behind the box, make one sound at a time. Children whisper their guess to a partner, then you reveal it. Do four or five sounds.
2. **Same or different? (5 min).** Make two sounds, one after the other. Children show thumbs up for "same" and thumbs sideways for "different". Start with very different pairs (bell, then paper) and move to closer pairs (bell, then bell rung softly).
3. **Same or different words? (4 min).** Now say two words: cat, cat (same); cat, cap (different); sun, sun (same); dog, dig (different). Thumbs again. This is harder; it is fine if some children still guess.

Optional listening walk (10 min): walk round the school grounds and stop three times to listen. Add the new sounds to the sheet.

✓ Discussion questions (with answers)

- Which sound was easiest to guess? Why? Answers will vary; often a sound they hear every day, such as keys.
- Were cat and cap the same? No, they sound different at the end.

- What helps us listen well? Being quiet and paying attention to the speaker. Accept different ways of paying attention; some children listen best while moving or not looking.

✓ Closing check (with answers)

Say three pairs. Children answer with thumbs.

1. bell / bell (same)
2. fish / dish (different)
3. hat / hat (same)

Vocabulary

listen, sound, same, different, quiet, loud

Differentiation

- **Support:** let a child hold and make the sound themselves, then hide it. Use only very different sound pairs.
- **Stretch:** "I am going to say three words. Which one is different?" (pin, pin, pan).

⚠ Safety

Keep small sound-makers away from children who still put objects in their mouths. On a listening walk, follow your school's rules for leaving the classroom.

Teacher notes and misconceptions

- Some children will name what the object is for ("it's for the door") rather than the sound; that is fine at this stage.
- "Different" with words is much harder than with objects. Expect many errors; this skill comes back every week.

Lesson 2: Rhyme time

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 20-25 minutes.

Goal

Children hear that rhyming words sound the same at the end, say whether two words rhyme, and make up a rhyme (real or silly) for a simple word.

Materials

- A nursery rhyme the class half-knows, for example Humpty Dumpty (traditional, public domain).
- Picture cards: cat, hat, mat, sun, bun, dog, log, fish, dish, pen, hen, plus a few that do not rhyme with any (ball, cup, tree).

Steps

✎ Opening (5 min)

Say Humpty Dumpty together twice. The second time, stop before the rhyming word: "Humpty Dumpty sat on a wall, Humpty Dumpty had a great..." Children shout "fall!" Say: "Wall and fall rhyme. They sound the same at the end."

✎ Main activity (15 min)

1. **Rhyme or not? (5 min).** Say two words. Children pat their head if they rhyme and keep hands still if not: cat, hat (rhyme); sun, dog (no); pen, hen (rhyme); fish, cup (no); log, dog (rhyme).
2. **Odd one out (5 min).** Show three picture cards and say the names slowly. "Which one does not rhyme?" Sets: cat, hat, sun (sun); dog, log, fish (fish); bun, pen, sun (pen).
3. **Make a rhyme (5 min).** Say a word and invite rhymes, real or silly. cat: hat, mat, bat, zat. sun: bun, fun, run, wun. Praise silly rhymes that really rhyme; they show the child hears the ending.

✓ Discussion questions (with answers)

- How do you know two words rhyme? They sound the same at the end.
- Is zat a real word? No, but it rhymes with cat, so it counts in this game.
- Do cat and cup rhyme? They both start the same. No; rhyming is about the end, not the start.

✓ Closing check (with answers)

Each child, in turn or in small groups, tells you a word that rhymes with hen (pen, ten, men, den, or a silly rhyme like ken or zen).

Vocabulary

rhyme, end, same, silly word

Differentiation

- **Support:** use only "rhyme or not" with picture cards in front of the child; say the two words with a strong stress on the ending.
- **Stretch:** make a three-word rhyme chain (cat, hat, mat), or finish a new line: "I saw a dog sitting on a ..." (log).

⚠ Safety

No special hazards.

Teacher notes and misconceptions

- Many children first think words "rhyme" if they start the same (cat, cup). Name this clearly: rhyme is about the end.
- Rhymes depend on accent. If a pair rhymes in a child's speech, accept it.
- Producing a rhyme is harder than recognising one; it is normal for some children to manage only "rhyme or not" this term.

Lesson 3: Clap the beats

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 20-25 minutes.

Goal

Children clap the syllables ("beats") in their names and in familiar words, count them, and put words back together from their beats.

Materials

- Picture cards: cat, sun, apple, rabbit, pencil, banana, elephant, dinosaur, caterpillar.
- Three hoops or trays labelled with 1, 2 and 3 dots.

Steps

✎ Opening (5 min)

Clap your own name, one clap per beat, saying it as you clap ("Ms Ro-sa": 3 claps). Go round the circle: each child says and claps their name and the class claps it back. Do not correct anyone harshly; just clap it again together.

✎ Main activity (15 min)

1. **Clap and count (5 min).** Hold up a picture card. Say the word slowly, clap it together, then hold up fingers for the number of claps.
2. **Sort the beats (6 min).** In small groups, children clap each card and put it in the 1-dot, 2-dot or 3-dot hoop. Keep caterpillar back for the challenge.
3. **Robot talk (4 min).** Say a word in beats like a robot: "ra...bbit". Children say the whole word ("rabbit!"). Then let a child be the robot.

✓ Discussion questions (with answers)

Common answers in standard English; accept a different count if that is how the child says the word.

- How many beats in cat? 1.
- How many in apple? 2 (ap-ple).
- How many in banana? 3 (ba-na-na).
- Which word had the most beats? Caterpillar, with 4 (cat-er-pil-lar).
- Does a big animal always have a long word? No: a whale is huge but has 1 beat, and a caterpillar is small but has 4.

✓ Closing check (with answers)

Answer key for the sort: 1 beat: cat, sun. 2 beats: apple, rabbit, pencil. 3 beats: banana, elephant, dinosaur. Challenge: caterpillar, 4.

Each child claps one card on their own and says how many beats.

Vocabulary

beat, clap, syllable (teacher word; children can say "beat"), count

Differentiation

- **Support:** clap with the child, hand over hand if they like that; use only 1- and 2-beat words.
- **Stretch:** find a classmate's name with the same number of beats as yours; try 4-beat words (watermelon, helicopter).

⚠ Safety

No special hazards.

Teacher notes and misconceptions

- Children often clap once per word in a phrase, or clap the rhythm of a song instead. Slow the word right down and exaggerate each beat.
- Where exactly a syllable splits (rab-bit or ra-bbit) does not matter here; the count does.
- Some children's names are long or from languages the teacher does not speak. Ask the child or family how to say it, and clap it their way.

Lesson 4: How a book works

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 20-25 minutes.

Goal

Children show the front cover and title of a book, where to start reading, and which way to go (left to right, top to bottom, page by page). They see that words are separated by spaces and point to one word.

Materials

- One big book (or a picture book under a visualiser) with one or two short lines of large print per page.
- A pointer (a ruler or a stick with a star on the end).
- Small picture books, one per pair.

Steps

✎ Opening (5 min)

Hold the big book upside down and back to front. "I'm ready to read!" Let children tell you what is wrong. Turn it the right way and name the parts together: front cover, back cover, title, the person who wrote it (author), the person who drew the pictures (illustrator).

✎ Main activity (15 min)

1. **Shared reading (8 min).** Read the book aloud, running the pointer under each word as you say it. On two or three pages, stop and ask a child to show "Where do I start?" (top left of the text) and "Where do I go next?" (along the line to the right, then down to the next line, then the next page).
2. **Spot the spaces (3 min).** On one page, count the words together by pointing at each one. Ask: "How do we know where one word ends?" (there is a space). Then a child puts a finger on one word.
3. **Pair book check (4 min).** In pairs with a small book, each child shows their partner the front, the title and where to start reading.

✓ Discussion questions (with answers)

- Where is the title? On the front cover, usually in big letters.
- Where do we start reading on a page of this book? At the top, on the left (true for English; some scripts start on the right).
- Which way do we go in this book? Left to right along the line, then down to the next line, then turn the page.

- How do we know where one word ends? There is a space after it.
- Do we read the pictures or the words? We read the words; the pictures help us understand.

✓ Closing check (with answers)

With a book in front of each child (small groups), ask them to show: the front cover; the title; where to start reading; one word. Tick each on the class list.

Vocabulary

cover, title, author, illustrator, page, word, space, left, right, top, bottom

Differentiation

- **Support:** a green dot sticker at the top left of the first line on each page as a "start here" sign.
- **Stretch:** count the words on a line; find two words that are the same on one page.

⚠ Safety

No special hazards.

Teacher notes and misconceptions

- Many children think the pictures are what we read, or point at letters rather than words. Keep the pointer under whole words.
- Left to right and top to bottom are features of English print. Children who read another script at home (for example Arabic or Hebrew, read right to left) already know that books have a direction; say so warmly.
- Ending the book: show that we stop at the back cover, and talk about whether they liked it. Enjoying books matters as much as these skills.

Lesson 5: First sounds

Unit overview - Previous: Lesson 4

About 20-25 minutes.

Goal

Children hear and say the first sound of a familiar spoken word, and sort objects by their first sound. This is listening work; children do not need to know letters yet.

Materials

- A tray of 10-12 real objects, for example: sock, spoon, sun picture (s); ball, bus, bear (b); cup, car, cat picture (k sound); pencil, pen, pig (p).
- Two hoops or trays.

Steps

✎ Opening (5 min)

Say a sound and a word slowly, stretching the first sound if it can be stretched: "sssss-un. Sun starts with /s/." Model saying /s/ as a short hiss, not "suh". Children copy. Repeat with mmmm-ilk and fffff-ish.

✎ Main activity (15 min)

1. **I spy (6 min).** "I spy with my little eye something that starts with /b/." Children point to the ball, bus or bear. After a few turns, let a child choose.
2. **Sound sort (6 min).** Two hoops: one for /s/, one for /b/. Each child picks an object, says its name, says its first sound and puts it in the right hoop. Leave any that fit neither on the tray.
3. **Name sounds (3 min).** "Stand up if your name starts with /m/." Go through a few sounds that match names in the class.

✓ Discussion questions (with answers)

- What sound does sock start with? /s/.
- Does ball start the same as bus? Yes, both start with /b/.
- Does cat start the same as car? Yes, both start with the /k/ sound.
- Does sun start the same as fish? No: /s/ and /f/.

✓ Closing check (with answers)

Hold up three objects one at a time. Children say the first sound together, then one child at a time in small groups:

1. pen (/p/)
2. spoon (/s/)
3. bear (/b/)

Vocabulary

sound, first, start, same, different, "I spy"

Differentiation

- **Support:** start with sounds that can be stretched (/s/, /m/, /f/) before short ones (/b/, /p/, /k/); give a choice of two: "Does sun start with /s/ or /b/?"
- **Stretch:** "What sound does cat end with?" (/t/). Or show the letter for a sound the child already knows; letter work starts properly in term 2.

⚠ Safety

Use objects too large to swallow; check the tray before the lesson.

Teacher notes and misconceptions

- Say sounds cleanly: /s/ not "suh", /m/ not "muh". An added "uh" makes later blending harder.
- Some first sounds are spelled differently from what children might expect (cat and kite both start with /k/). In this lesson we sort by sound, not spelling, so they go together.
- Children often answer with the whole word or a rhyme. Model again: "sun. The first sound is /s/."
- Common Core lists isolating first, middle and last sounds in CVC words as a kindergarten skill (RF.K.2.d). This lesson does only first sounds; middle and last sounds come later in the year.

Kindergarten Literacy: Letter Sounds, Blending and Writing My Name (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 on 9 November 2026. No human teacher has reviewed this unit. CC0 1.0 (public domain). Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Part of the kindergarten year plan (language and literacy, term 2: "letter sounds and their shapes; blending two or three sounds into a word (c-a-t); writing their name and single letters"). It follows Listening, Rhymes and How Books Work (term 1), where children clapped syllables and heard the first sound of a word.

This unit is written for **English**. Other languages need their own letter order and word lists.

Big idea

Letters stand for sounds. If we know the sound for each letter, we can say the sounds one after another and **blend** them into a word we know (s-a-t, "sat"). We can also go the other way: hear a sound and write the letter for it.

Outcomes

By the end of the unit, most children can:

1. Say the sound for each of six letters: **s, a, t, i, p, n**, when shown the lowercase letter.
2. Point to or pick the right letter when they hear one of these six sounds.
3. Blend three sounds into a short word, first by listening (the teacher says s-a-t) and then from letter cards (sat, pin, tap, tin).
4. Form the six letters (by writing, tracing, or making them with their finger, in sand or with magnetic letters).
5. Recognise their own first name and write or trace it.

Prior knowledge

- The term 1 unit: listening for sounds, rhyme, clapping syllables, and saying the first sound of a word (pen /p/, spoon /s/).
- Holding a crayon or thick pencil (from drawing in arts). Children who cannot yet do this still take part with finger tracing, sand and magnetic letters.

Why these six letters?

Many phonics programmes start with **s, a, t, i, p, n**, because their sounds are easy to say on their own and together they make many short words. This unit uses only words made of these six letters:

sat, pat, tap, nap, pan, pin, tin, tip, sip, sit, pit, at, it, in, an

Teach the **sound** of each letter (the sound it makes in "sat"), not its name ("ess"). Letter names come later, often through the alphabet song.

Saying the sounds

Say each sound as short and pure as you can, with no extra "uh" on the end:

Letter	Say	As in	Not
s	"sss" (hold it, like a snake)	sun	"suh"
a	short "a"	ant, apple	"ay" (the letter name)
t	a short, quiet "t" (just a puff)	tap	"tuh"
i	short "i"	ink, in	"eye" (the letter name)
p	a short, quiet "p" (just a puff)	pan	"puh"
n	"nnn" (hold it, humming through the nose)	net	"nuh"

Accents vary, so the vowel sounds in your area may differ a little from someone else's. Use the way people say these words locally.

Lessons

Short daily practice matters more than long lessons. After lesson 1, start every day with a 3-minute "sound flash" (hold up each letter card learned so far; children say the sound).

Lesson	Title	Time	Core idea
1	s, a, t	20 min	Three letter sounds and their shapes
2	i, p, n	20 min	Three more sounds, and a sound hunt
3	Blend it!	25 min	Blending sounds into words, by ear and then from cards
4	My name	25 min	Recognising and writing my name; forming the six letters
5	Show what I know	25 min	Making and reading words, and a one-to-one check

Materials

- **Letter cards:** large lowercase cards for s, a, t, i, p, n (one set for the teacher). Small sets for pairs (one set of six per pair, plus a second **a** and **i** so that words with the same vowel twice are possible later).
- **Picture cards** for the sound hunt (lesson 2): sun, sock, ant, apple, tap, tent, ink, insect, pan, pig, net, nest (two per sound). Drawings or photos are fine.
- **Name cards:** each child's first name, printed clearly with a capital first letter and the rest lowercase (lesson 4).
- **A tray of sand or salt**, or a shaving-foam patch on a table, for finger writing (lessons 1, 2, 4).
- **Magnetic or foam letters** (at least s, a, t, i, p, n for each pair) and a magnetic board or tray.
- Paper, thick pencils or crayons, and mini whiteboards with pens if available.
- A puppet or soft toy that "talks in sounds" (lesson 3).
- Picture cards for blending: a tap, a pin, a tin can and a child sitting (lessons 3 and 5); word cards **sat**, **pin**, **tap**, **tin** and a record sheet for the check (lesson 5).
- Dotted or pale copies of each child's name for tracing (lesson 4).

Access and inclusion

- **Speaking is optional.** A child can answer by pointing to a card, picking a magnetic letter, signing, or using their usual communication aid. Never make a child say sounds alone in front of the class.
- **Fine motor:** forming a letter in sand, with a finger in the air, by placing magnetic letters or by tracing over dots all count as forming it. Pencil grip is taught gently and is never a reason to mark a child "not yet".
- **Low vision:** large print cards (or high-contrast cards); tactile letters (sandpaper, felt or foam). If a child uses or will use braille, ask the specialist teacher how to link these sounds to braille letters.
- **Deaf or hard-of-hearing children:** keep your face visible when saying sounds; pair each sound with its letter card. If the child signs, follow the specialist teacher's approach (some use fingerspelling or a visual phonics system).
- **Speech differences:** some children cannot yet say some sounds clearly (for example "s"). They can still match sounds to letters by pointing; tell the speech therapist, if there is one, which sounds the class is learning.
- **Multilingual learners:** some children already read or write another language, sometimes with a different script or different sounds for the same letter. Treat this as a strength and keep the English sounds clear.
- **Names:** use first names only. Never ask for surnames, addresses or other family details. Children with long or unusual names are not slower; any name works.
- **Never timed.** Accuracy comes before speed.

Assessment

Lesson 5 includes a short one-to-one check (about 3 minutes per child; spread it over the week). Record each part as **yes**, **with help** or **not yet**:

1. Says the sound (or points to the letter, if non-speaking) for each of the six letter cards.
2. Blends four words from letter cards: **sat, pin, tap, tin** (the child says the sounds, then the word; or picks the matching picture).
3. Writes (or picks a magnetic letter for) three letters when the teacher says their sounds: **/t/, /i/, /s/**.
4. Writes or traces their first name.

Doing it their own way (pointing, signing, magnetic letters, sand) counts as **yes**. "Not yet" is normal for many children at this point; the term 3 unit keeps practising these sounds with more letters.

Sources

- Common Core State Standards, Reading: Foundational Skills, Kindergarten (read via the Internet Archive copy): https://web.archive.org/web/20241220022036/https://www.thecorestandards.org/ELA-Literacy/RF/K/ . RF.K.1.d (recognise and name upper- and lowercase letters), RF.K.2.d (isolate and pronounce the first, middle vowel and final sounds in three-sound words), RF.K.3.a (the most frequent sound for each consonant) and RF.K.3.b (vowel sounds). This unit covers only six letters, so it is a small start on these standards, not full coverage.
- Common Core State Standards, Language, Kindergarten (Internet Archive copy): https://web.archive.org/web/2024/https://www.thecorestandards.org/ELA-Literacy/L/K/ . L.K.1.a

"Print many upper- and lowercase letters"; L.K.2.c "Write a letter or letters for most consonant and short-vowel sounds (phonemes)"; L.K.2.d "Spell simple words phonetically, drawing on knowledge of sound-letter relationships."
- Wikipedia, "Synthetic phonics": https://en.wikipedia.org/wiki/Synthetic_phonics . Letter sounds are taught in isolation and then blended all through the word (s-a-t, "sat"); s, a, t, i, p, n make many short words; programmes often teach a few letter sounds a week; letter shapes are practised alongside the sounds; dictation is used often; letter names often come later; accuracy before speed. This unit follows that order.

Known gaps

- **English only.** Other languages need their own letters and words.
- **Pace varies.** Many programmes teach these six sounds in about a week; this unit spreads them over two to allow daily practice. Some classes will need longer, and some children already know them.
- **Capital letters** appear only in names here. Most capitals come later.
- **No decodable books yet**; reading short books is term 3.
- Peer check: Gemini 4 Argon did a bounded text, timing, word-list, pure-sound and access check at f5ca874 (not a classroom or educator review). No errors; three small notes on materials lists and a non-finger option were fixed in fc3ea92, which Gemini 4 Argon also diff-checked the same day (see PEERCHECKS.md).
- This is one possible order. It is not tied to any published phonics programme, and schools that follow one should use its order instead.

Lesson 1: s, a, t

Goal: Children say the sounds for **s**, **a** and **t**, and form each letter with a finger.

Length: about 20 minutes.

Materials

- Large letter cards s, a, t.
- Picture cards: sun, sock, ant, apple, tap, tent.
- Sand or salt tray (or shaving foam on the table); magnetic letters s, a, t.

Steps

✎ Opening (3 min)

Play the first-sound game from term 1: "I spy something that starts with /s/..." (a sock, the sun on a poster). Then: "Today we learn how to **write** some sounds down."

✎ Main activity 1: meet the sounds (6 min)

Hold up **s**. "This letter says **sss**, like a snake." Children hiss with you, holding the sound. Show the sun and sock pictures: "sss-un, sss-ock." Then air-write the letter together: big, with the whole arm, saying "sss" as you write. (Stand with your back to the class, or mirror it, so the letter is not backwards for them.)

Do the same for **a** ("a, a, ant, apple"; a quick tap of the fingers, like an ant walking) and **t** (a short "t", like a ticking clock; tap, tent).

Keep sounds pure: "sss", not "suh"; "t" as a quiet puff, not "tuh".

✎ Main activity 2: sand writing (6 min)

In small groups at the sand tray (or at tables with foam), children copy each letter with one finger while saying its sound. Children who prefer can pick the magnetic letter and trace it with a finger instead.

Letter starting points (say them as you show):

- **s**: start at the top, curve round to the left, back round to the right, and finish curling at the bottom.
- **a**: round like a "c", up, and straight down.
- **t**: down from the top, then a small line across.

✓ Discussion questions (with answers) (2 min)

- "Which sound can you hold for a long time?" (**s**: "sssss". **t** is too quick to hold.)

- "What sound does 'apple' start with?" (/a/, the letter **a**.)

✓ Closing check (with answers) (3 min)

Hold up each card in a new order: **t**, **s**, **a**. Children say the sound together, or point.

Answers: /t/, /s/, /a/.

Then say a sound, and children point to the card: /a/ → **a**.

Vocabulary

letter, sound, s, a, t

Differentiation

- **Support:** work on **s** and **a** only today; add **t** tomorrow.
- **Stretch:** children find another object in the room that starts with /s/, /a/ or /t/.

⚠ Safety

- Salt and sand stay in the tray; wash hands afterwards. Shaving foam can sting eyes: keep hands away from faces and wash after. Skip foam for children with sensitive skin.

Teacher notes

- It does not matter if children's letters are wobbly at this stage. The link between the sound and the shape is what matters.
- Pointing to the right card counts the same as saying the sound.

Lesson 2: i, p, n

Goal: Children say the sounds for **i**, **p** and **n**, and sort pictures by their first sound.

Length: about 20 minutes.

Materials

- Large letter cards s, a, t, i, p, n.
- Picture cards: sun, sock, ant, apple, tap, tent, ink, insect, pan, pig, net, nest.
- Sand tray or foam; magnetic letters.

Steps

✎ Opening (3 min)

Sound flash: hold up **s**, **a**, **t**; children say each sound.

✎ Main activity 1: meet the sounds (6 min)

As in lesson 1, one at a time:

- **i**: a short "i", as in ink and insect. (Wiggle a finger like a little insect.)
- **p**: a short puff, as in pan and pig. Hold a hand in front of your mouth to feel the puff.
- **n**: "nnn", humming through the nose, as in net and nest.

Air-write each one, saying the sound:

- **i**: straight down, then a dot on top.
- **p**: straight down below the line, back up, and round.
- **n**: straight down, back up, and over like a little hill.

✎ Main activity 2: sound hunt (7 min)

Lay the six letter cards on the floor. Shuffle the twelve picture cards, and hand them out (one each, or pairs share). Each child says the picture's name, listens for the first sound, and puts the picture next to its letter. The class checks together: "Pig. P-p-pig. Yes, **p**!"

A child who is not sure can say the word with a friend or the teacher, slowly. Nobody is wrong for long: if a picture is in the wrong place, say both sounds and move it together.

✓ Discussion questions (with answers) (2 min)

- "Which two letters can you hold for a long time?" (**s** and **n**. Vowels **a** and **i** can be held a little too; **t** and **p** are quick puffs.)
- "Pig and pan both start with...?" (/p/, the letter **p**.)

✓ Closing check (with answers) (2 min)

Hold up **n**, **i**, **p**, then **s**. Children say the sounds or point.

Answers: /n/, /i/, /p/, /s/.

Vocabulary

i, p, n, first sound

Differentiation

- **Support:** fewer pictures (just one per letter); the adult says the word slowly first.
- **Stretch:** children say the **last** sound of a picture too (tap ends in /p/; sun ends in /n/).

⚠ Safety

- As lesson 1 (wash hands after sand, salt or foam).

Teacher notes

- Some children confuse **p** with other round letters that come later; that is normal and can wait.
- If your class's word for a picture differs (for example "faucet" for tap), choose a different picture that starts with the same sound.

Lesson 3: Blend it!

Goal: Children blend three sounds into a word: first by listening, then from letter cards.

Length: about 25 minutes.

Materials

- Large letter cards s, a, t, i, p, n (and a second **a** card, or write on the board).
- The puppet or soft toy.
- Magnetic letters for each pair: s, a, t, i, p, n.
- Picture cards for the closing check: a tap, a pin, a tin can (or draw them).

Steps

✎ Opening (3 min)

Sound flash: all six cards, in a new order each time.

✎ Main activity 1: the puppet talks in sounds (6 min)

"Our puppet only talks in sounds. Can you help it say the word?" The puppet says **s-a-t** with a small gap between sounds. Children say the sounds back, faster and faster, until they hear the word: "s-a-t... sat!"

Repeat by ear only (no cards yet) with: **p-i-n**, **t-a-p**, **n-a-p**, **s-i-t**, **t-i-n**.

Then the other way round: "Puppet wants to know the sounds in 'pan'." Children say **p-a-n**, holding up one finger for each sound (three fingers, three sounds), or tapping or pointing to three counters or blocks, one for each sound.

✎ Main activity 2: blending from cards (8 min)

Put the cards **s**, **a**, **t** in a row. Point under each letter from left to right and say its sound. Then sweep your finger under all three and say the word: "s-a-t, sat."

Do it together with **p-i-n**, **t-a-p** and **n-a-p**.

In pairs, with magnetic letters: the teacher says a word slowly; pairs build it, then point and blend to check. Words: **sat**, **tip**, **pan**, **sit**. Walk round and help.

✓ Discussion questions (with answers) (4 min)

- "How many sounds are in 'tin'?" (Three: /t/, /i/, /n/.)
- "If I change the first sound of 'sat' to /p/, what word do I get?" (**pat**.)
- "Which way do we read the letters?" (From left to right, as in the term 1 book work.)

✓ Closing check (with answers) (4 min)

Show three cards for each word; children blend, then point to the matching picture:

- **t a p** → tap (the tap picture)
- **p i n** → pin
- **t i n** → tin

Answers: tap, pin, tin.

Vocabulary

blend, sounds, word

Differentiation

- **Support:** two-sound words first: **at**, **it**, **in**, **an**. Keep the gap between sounds very short ("sssaaat").
- **Stretch:** children make a word and challenge their partner to read it, using only these letters: sat, pat, tap, nap, pan, pin, tin, tip, sip, sit, pit.

⚠ Safety

- Magnetic letters are small; check they are too big to swallow for any child who still puts things in their mouth, and count them back into the tray.

Teacher notes

- Holding sounds that can be held ("sssaaat") makes blending easier than very separate sounds ("s ... a ... t").
- Many children can blend by ear before they can blend from letters. That is normal.

Lesson 4: My name

Goal: Children recognise their own first name, write or trace it, and form the six letters.

Length: about 25 minutes.

Materials

- Name cards (first names only), with a capital first letter and the rest lowercase.
- A copy of each child's name written in dotted or pale letters for tracing.
- Paper, thick pencils or crayons; sand tray; magnetic letters.
- Mini whiteboards and pens, if available (for the closing check).
- Large letter cards s, a, t, i, p, n.

Steps

✎ Opening (3 min)

Sound flash with the six cards. Then blend two words with the puppet by ear: **n-a-p**, **s-i-p**.

✎ Main activity 1: find my name (6 min)

Lay out the name cards (or a group's cards on each table). Each child finds their own card. "How do you know it's yours?" (The first letter, the shape, how long it is.)

Point out that names start with a **capital letter**, a big letter for the start of a name. Then children look for any of our six letters in their name: "Sam has an **a**! Nia has an **i** and an **a**, and starts with a capital **N**!" Every name counts, even if it has none of the six: "Your name has other letters we will learn soon."

✎ Main activity 2: writing (10 min)

At tables:

1. **My name:** children trace over their dotted name, then try to copy it underneath, looking at the card. Tracing alone is fine for today.
2. **The six letters:** children write a row of each letter they can, saying the sound as they write. Remind them where each letter starts (lessons 1 and 2).

Show a comfortable pencil hold (often a "tripod": thumb and two fingers), but do not insist; chunky crayons, pencil grips, sand, a finger in the air or magnetic letters are all fine.

✓ Discussion questions (with answers) (3 min)

- "What is special about the first letter of your name?" (It is a capital letter.)

- "Which of our six letters is in the word 'pin'?" (All three: **p**, **i**, **n**.)

✓ Closing check (with answers) (3 min)

The teacher says a sound; children write the letter on a whiteboard or paper, or hold up a magnetic letter: /s/, /p/, /a/.

Answers: **s**, **p**, **a**.

Vocabulary

name, capital letter, trace

Differentiation

- **Support:** trace only the first letter of the name, or make the name with magnetic letters copied from the card.
- **Stretch:** write the name without looking at the card; write the word **sat** from its sounds.

⚠ Safety

- Pencils stay on the table, points down, when walking.

Teacher notes

- Use the spelling the family uses. If you are unsure, ask the child or the family how the name is written; do not shorten or change it.
- Never ask for surnames. Display names only as the school allows.
- A child whose name is written in another script at home can show it too, if they want to.

Lesson 5: Show what I know

Goal: Children use the six sounds to make and read words, and show what they know in a short one-to-one check.

Length: about 25 minutes for the class activities, plus about 3 minutes per child for the check (spread over the week).

Materials

- Large letter cards s, a, t, i, p, n; magnetic letters for each pair.
- The sand tray; name cards; the tracing sheets from lesson 4.
- Word cards for the check: **sat**, **pin**, **tap**, **tin**, and pictures of each (a child sitting, a pin, a tap, a tin can).
- The twelve picture cards from lesson 2 (for the picture-sound sort station).
- A record sheet (yes / with help / not yet for each part).

Steps

✎ Opening (3 min)

Sound flash with all six cards. Children say the sound and air-write each letter.

✎ Main activity 1: word builders (8 min)

In pairs with magnetic letters. The teacher says each word; pairs build it, then point and blend to check: **pan**, **sit**, **tip**, **nap**.

Then a "change one letter" round: pairs swap one letter to make a new real word and read it to the class (for example **pan** → **pin** → **tin**).

✎ Main activity 2: stations (10 min)

While the teacher starts the one-to-one checks, the class moves between three stations (adult helpers if possible):

1. **Sand tray:** write the six letters with a finger.
2. **Name station:** trace or write their name.
3. **Picture-sound sort:** the twelve picture cards from lesson 2 sorted by first sound.

✓ Discussion questions (with answers) (2 min)

- "What do we do to read a new word?" (Say each sound, from left to right, then blend them together.)
- "What letter would you write for the first sound in 'nest'?" (**n**.)

Closing (2 min)

Children show one word they built, or their name, to a partner.

One-to-one check (with answers)

About 3 minutes per child, spread over the week, quietly at a side table. Record **yes**, **with help** or **not yet**:

1. **Sounds:** show the six letter cards in a mixed order. The child says each sound (or, if non-speaking, points to the right card when you say the sound). Answers: s /s/, a /a/, t /t/, i /i/, p /p/, n /n/.
2. **Blending:** show **sat**, **pin**, **tap**, **tin**. The child says the sounds and the word, or points to the matching picture. Answers: sat, pin, tap, tin.
3. **Writing sounds:** say /t/, /i/, /s/. The child writes each letter (or picks the magnetic letter). Answers: **t**, **i**, **s**.
4. **Name:** the child writes or traces their first name.

Their own way (pointing, signing, magnetic letters, sand) counts as **yes**. Never time the check.

Vocabulary

Review: sound, letter, blend, word, name, capital letter.

Differentiation

- **Support:** two-sound words at the builder station (at, it, in, an); check one part a day.
- **Stretch:** read two-word phrases made only of the six letters: "tin pan", "pat it", "sip it".

⚠ Safety

- As lessons 1–4: count magnetic letters back in; wash hands after the sand tray.

Teacher notes

- "Not yet" is normal at this point; record it without fuss. These sounds return every day in term 3.
- Children who already read well can make longer words at the stations with extra magnetic letters.

Kindergarten Literacy: Reading a Little Book, Tricky Words and My First Sentence (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 on 9 November 2026. No human teacher has reviewed this unit. CC0 1.0 (public domain).
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Part of the kindergarten year plan (language and literacy, term 3: "reading short decodable books; a few common words by sight; writing a short sentence with help"). It follows Letter Sounds, Blending and Writing My Name (term 2), where children learned the sounds **s, a, t, i, p, n**, blended three-sound words and wrote their first name.

This unit is written for **English**. Other languages need their own letter order, word lists and books.

Big idea

When we know enough letter sounds, we can read a whole little book by ourselves. A few very common words have a **tricky part** we cannot sound out yet, so we learn those by looking carefully. And we can turn something we say into a sentence we write.

Outcomes

By the end of the unit, most children can:

1. Say the sound for eight more letters: **m, o, d, g, c, k, e, u**, as well as the six from term 2.
2. Blend three-sound words that use these fourteen letters (cup, dog, ten, mud).
3. Read four tricky words: **I, the, is, my**, and say which part is tricky.
4. Read a short decodable book, Pip and the Mud, pointing to each word from left to right.
5. Write (or build) a short sentence with help, starting with a capital letter, leaving spaces between words and ending with a full stop.

Prior knowledge

- The term 2 unit: the sounds s, a, t, i, p, n; blending sat, pin, tap, tin; writing their first name.
- The term 1 unit: following a book from left to right and page by page.
- Children who have not yet secured all six term 2 sounds still take part; the opening of every lesson reviews them.

Letters and words in this unit

Lessons 1 and 2 add eight letter sounds, about four a week:

- Lesson 1: **m, o, d**
- Lesson 2: **g, c, k, e, u**

c and **k** make the same sound, /k/. In this unit **c** comes before a, o and u (cat, cot, cup) and **k** comes before i and e (kit, kid). Children only need to know that both letters can make /k/.

Decodable words used in this unit (only from the fourteen letters s, a, t, i, p, n, m, o, d, g, c, k, e, u):

mat, map, man, mad, sad, dad, dim, dip, mop, top, pot, dot, not, on, nod, and, am, got, dog, dig, pig, cat, cot, cup, cap, can, kit, kid, pet, ten, net, men, peg, get, gets, up, mud, sun, nut, pup, cut, tug, dug, pen, Dot, Pip

Words from term 2 also come back: **a, in, sit, sat, pat, tap, nap, pin, tan**.

None ends in /l/, /r/ or /x/. Teach the **sound** of each letter, not its name, as in term 2: "mmm", not "em"; "d" as a short quiet sound, not "duh".

Tricky words

These four common words appear in the book and the sentences. Each has a part children cannot sound out with the letters they know, but most of the word still follows the sounds:

Word	What works	Tricky part
I	It is one letter.	It says its name, "eye", and it is always a capital letter.
the	We know all three letters.	**t** and **h** together make one new sound, and **e** says "uh" here.
is	**i** says /i/.	**s** says /z/ here, not /s/.
my	**m** says /m/.	**y** says "eye" here.

Three of these (the, is, my) are in the Common Core kindergarten list of examples; "I" is needed for the sentence frame. Teach them a few at a time, sounding out the regular part first and then noticing the tricky part, rather than as whole shapes to memorise.

Lessons

1. New sounds: m, o, d (25 min)
2. New sounds: g, c, k, e, u (25 min)
3. Tricky words and captions (20 min)
4. Reading our book: Pip and the Mud (25 min)
5. My first sentence, and show what I know (25 min)

Leave a few days between lessons for daily practice: a 5-minute sound flash, blending three words and reading a page of the book again.

Materials

- Large letter cards for all fourteen letters, with a second copy of the vowels **a, i, o, e, u**.
- Magnetic letters for each pair (the same fourteen letters).
- Word cards for the decodable words in each lesson.
- Four tricky-word cards (**I, the, is, my**) on coloured card, so they stand out from the other words.
- Caption strips for lesson 3.
- Copies of Pip and the Mud (one per pair, from the text in lesson 4; children add the pictures), and one large copy for the class.

- Picture cards for lessons 2 and 5 (listed in each lesson).
- Sentence strips with the frame "I can ___." and eight picture word cards for lesson 5.
- Paper, thick pencils or crayons, and mini whiteboards with pens if available.
- A record sheet for the one-to-one check.

Access

- **Speaking is optional.** A child can show they know a sound or word by pointing, choosing a card, signing or using their communication device. That counts as success.
- **Fine motor:** children who find writing hard can build words and sentences with magnetic letters or word cards, or trace over an adult's pale writing.
- **Low vision:** use large, high-contrast cards and a big-print book; braille learners follow their own braille reading programme alongside, with the same words where possible.
- **Deaf or hard of hearing children:** sit close, face the child when saying sounds, and use any visual cues or signed supports the child already uses.
- **Speech differences:** accept a child's own way of saying a sound if they clearly mean the right letter.
- **Children learning English** may not know words such as "cot", "peg" or "tug". Show a picture or act each word out before reading it.
- Never time children's reading, and never make a child read aloud to the whole class unless they want to.

Assessment

Lesson 5 includes a short one-to-one check (about 4 minutes per child; spread it over the week). Record each part as **yes**, **with help** or **not yet**:

1. Says the sound (or points to the letter) for each of the eight new letter cards: m, o, d, g, c, k, e, u.
2. Blends four words from cards: **cup, dog, ten, mud** (says the sounds and the word, or picks the matching picture).
3. Reads the four tricky words in any order: **the, is, I, my**.
4. Reads the sentence "The dog is in the mud." while pointing to each word.
5. Writes or builds "I can sit." after hearing it, with help if needed (a capital I, spaces and a full stop count as part of this).

Doing it their own way (pointing, signing, magnetic letters, word cards) counts as **yes**. Many children will still be "with help" on parts 4 and 5; grade 1 keeps building these.

Sources

- Common Core State Standards, Reading: Foundational Skills, Kindergarten (Internet Archive copy): https://web.archive.org/web/20241220022036/https://www.thecorestandards.org/ELA-Literacy/RF/K/ . RF.K.1.a (follow words from left to right, top to bottom and page by page), RF.K.1.c (words are separated by spaces), RF.K.3.a and RF.K.3.b (consonant and vowel sounds), RF.K.3.c ("Read common high-frequency words by sight (e.g., the, of, to, you, she, my, is, are, do, does)") and RF.K.4 ("Read emergent-reader texts with purpose and understanding"). This unit covers only part of these.
- Common Core State Standards, Language, Kindergarten (Internet Archive copy): https://web.archive.org/web/2024/https://www.thecorestandards.org/ELA-Literacy/L/K/ . L.K.2.a

("Capitalize the first word in a sentence and the pronoun I"), L.K.2.b ("Recognize and name end punctuation") and L.K.2.d (spell simple words phonetically).
- Common Core State Standards, Writing, Kindergarten (Internet Archive copy): https://web.archive.org/web/2024/https://www.thecorestandards.org/ELA-Literacy/W/K/ . W.K.3: children use "a combination of drawing, dictating, and writing" to tell about an event. The sentence in lesson 5 is a small start on this.
- Wikipedia, "Decodable text": https://en.wikipedia.org/wiki/Decodable_text . Decodable texts use words made from the letter sounds already taught (its example is "Pat the fat rat"); critics say such texts can be stilted.
- Wikipedia, "Sight word": https://en.wikipedia.org/wiki/Sight_word . Common words with unusual spellings are often taught by sight; the article also reports criticism of teaching whole words as shapes and says some educators teach them through explicit phonics instead.
- Wikipedia, "Synthetic phonics": https://en.wikipedia.org/wiki/Synthetic_phonics . Three to six letter sounds a week; blending all through the word; "tricky" words (with letter sounds not yet taught or unusual) introduced slowly, with phonics still working in part of the word.

Known gaps

- **English only.** Other languages need their own letters, words and books.
- **One small book.** Pip and the Mud is an original CC0 text written for this unit. Children need many more decodable books; schools usually use a published series that matches their phonics order.
- **Stilted text.** With only fourteen letters and four tricky words, the story is short and a little odd ("Mud is not on Pip"). That is normal for early decodable books.
- **Letters still missing:** h, b, f, l, r, j, v, w, x, y, z, qu and all digraphs (sh, ch, th as a taught sound). Grade 1 continues.
- **Pace varies.** Some classes will need much longer for eight new sounds; some children read already.
- Gemini 4 Argon text-checked this unit on 9 November 2026 (word lists, timings, materials and access); the three small notes were fixed in c1a8d03 and 837bab3, which Gemini 4 Argon also diff-checked the same day (see PEERCHECKS.md). A peer check by another AI is not a review by a teacher.
- This is one possible order. It is not tied to any published phonics programme, and schools that follow one should use its order and tricky words instead.

Lesson 1: New sounds: m, o, d

Goal: Children learn the sounds for **m**, **o** and **d**, and blend words using them with the term 2 letters.

Length: about 25 minutes.

Materials

- Large letter cards s, a, t, i, p, n, m, o, d.
- Magnetic letters for each pair: s, a, t, i, p, n, m, o, d.
- The sand tray (or foam on tables).
- Word cards: **mat, map, mop, dot, top, pot, mad, dip, sad** (**sad** is for the closing check).
- Picture cards for the closing check: a mop, a dot, a sad face (or draw them).

Steps

✎ Opening (3 min)

Sound flash with the six term 2 cards: s, a, t, i, p, n, in a new order each time. Children say each sound.

✎ Main activity 1: three new sounds (7 min)

Show **m**. "This letter says /m/, like the start of 'moon'. Hum it: mmm." Children say it, then write it in the air and in the sand: "Down, up and over, up and over." Children who prefer not to touch sand or foam can use a stick, a paintbrush or a dry-erase pen, as in term 2.

Show **o**. "This says /o/, like the start of 'octopus'." Children say it, then form it: "Round, all the way, and join."

Show **d**. "This says /d/, like the start of 'dog'. Keep it short and quiet: d." Form it: "Round like an **o**, then up tall and down."

Say each sound short and pure, as in term 2 ("mmm", not "muh").

✎ Main activity 2: blend with the new sounds (8 min)

Put **m a t** on the board. Point under each letter and say its sound, then sweep your finger under all three: "m-a-t, mat." Do the same with **m o p**, **d o t** and **m a d**.

In pairs, with magnetic letters: the teacher says a word slowly; pairs build it, then point and blend to check. Words: **map**, **top**, **pot**, **dip**.

✓ Discussion questions (with answers) (3 min)

- "What sound does the middle letter of 'dot' make?" (/o/.)

- "Change the first sound of 'mop' to /t/. What word is it now?" (**top**.)
- "Which new letter has a round part and a tall line?" (**d**.)

✓ Closing check (with answers) (4 min)

Show three word cards. Children blend each one and point to the matching picture:

- **m o p** → mop
- **d o t** → dot
- **s a d** → the sad face

Then show **m**, **o**, **d** in a new order and children say each sound.

Answers: mop, dot, sad; /m/, /o/, /d/.

Vocabulary

sound, letter, blend

Differentiation

- **Support:** practise one new sound at a time, with two-sound words first: **am**, **on**.
- **Stretch:** read the two-word phrases **a mop**, **dad sat**, **not on**, **pat and dip**.

⚠ Safety

Check the sand or foam for anything sharp before the lesson, and wash hands afterwards. Magnetic letters are small; keep them away from children who still put things in their mouths, or use large foam letters instead.

Teacher notes

- Some children confuse **d** with **b**. **b** is not taught in this unit, so do not introduce it now; just watch which way children form **d**.
- If a child's accent says /o/ differently, accept their own vowel.

Lesson 2: New sounds: g, c, k, e, u

Goal: Children learn the sounds for **g**, **c**, **k**, **e** and **u**, and blend words using all fourteen letters.

Length: about 25 minutes.

Materials

- Large letter cards for all fourteen letters: s, a, t, i, p, n, m, o, d, g, c, k, e, u.
- Magnetic letters for each pair (all fourteen).
- Word cards: **dog, cat, kit, pet, cup, mud, sun, ten**.
- Picture cards for the closing check: a cup, a dog, a pet (for example a hamster or a goldfish), and the sun.

Steps

✎ Opening (3 min)

Sound flash with all nine cards from lesson 1: s, a, t, i, p, n, m, o, d.

✎ Main activity 1: five new sounds (9 min)

Teach each sound in the same way as lesson 1: show the card, say the sound and a word that starts with it, say it together, then write it in the air.

- **g**: /g/, as in "goat". Short, from the throat.
- **c**: /k/, as in "cat".
- **k**: /k/, as in "kite". "**c** and **k** are two letters for the same sound."
- **e**: /e/, as in "egg".
- **u**: /u/, as in "up".

✎ Main activity 2: blend and build (7 min)

Blend together from cards: **d o g**, **c u p**, **k i t**, **p e t**.

In pairs, with magnetic letters: the teacher says a word; pairs build it and blend to check. Words: **sun**, **ten**, **mud**, **cat**.

Change one letter: build **pin**, then change it to **pen**, then **ten**, then **tan**. "Which letter changed?"

✓ Discussion questions (with answers) (3 min)

- "Which two letters both make the sound /k/?" (**c** and **k**.)
- "What sound is in the middle of 'mud'?" (/u/.)

- "How many sounds are in 'dog'?" (Three: /d/, /o/, /g/.)

✓ Closing check (with answers) (3 min)

Show each word card. Children blend it and point to the matching picture:

- **c u p** → the cup
- **d o g** → the dog
- **p e t** → the pet
- **s u n** → the sun

Answers: cup, dog, pet, sun.

Vocabulary

sound, same sound, change

Differentiation

- **Support:** focus on **e** and **u**, which are easy to mix up; say "egg" and "up" with an action (crack an egg, point up).
- **Stretch:** read **a cat on a cot**, **ten men**, **get up**, **cut the nut** (the tricky word "the" comes in lesson 3; read it for them for now).

Teacher notes

- In this unit **c** comes before a, o and u, and **k** before i and e. Children do not need the rule yet; they just need to know both make /k/.
- Five sounds in one lesson is a lot. Spread them over two or three short sessions if your class needs it, and keep practising daily before lesson 3.
- Picture of a pet: choose an animal your class knows. Children learning English may need to hear "pet" explained ("an animal that lives with a family").

Lesson 3: Tricky words and captions

Goal: Children read four tricky words (**I, the, is, my**) and use them to read short captions.

Length: about 20 minutes.

Materials

- The four tricky-word cards on coloured card: **I, the, is, my**.
- Large letter cards for the fourteen letters (for the opening).
- Caption strips: **I can dig.** / **The cat is on the mat.** / **My pup is in the mud.**
- Paper and crayons.

Steps

✎ Opening (3 min)

Sound flash with the eight new letters from lessons 1 and 2: m, o, d, g, c, k, e, u.

✎ Main activity 1: meet the tricky words (7 min)

Show one tricky word at a time. Sound out the part that works, then point to the tricky part:

- **is**: "**i** says /i/. Then **s**... but here it says /z/. Iz. Is." Children say it.
- **my**: "**m** says /m/. The **y** is tricky; here it says 'eye'. My."
- **the**: "We know these letters, but together **t** and **h** make a new sound, and **e** says 'uh'. The."
- **I**: "This word is just one letter, a capital I. It says 'eye'. It means me."

Mix the cards and hold them up quickly. Children say each word. Repeat a few times; the tricky words get easier each time.

✎ Main activity 2: read captions (5 min)

Show each caption strip. Read it together, pointing under each word from left to right. Children sound out the decodable words and say the tricky words.

Ask children to spot the capital letter at the start and the full stop at the end. "The full stop tells us the sentence has finished."

✓ Discussion questions (with answers) (2 min)

- "Which part of 'is' is tricky?" (The **s** says /z/.)
- "Why is the first letter of 'The cat is on the mat.' a capital?" (It is the start of a sentence.)

✓ Closing check (with answers) (3 min)

Hold up each tricky-word card in a new order. Children say the word (or point to the right card, if non-speaking). Then read the caption **My pup is in the mud.** together, pointing to each word.

Answers: I, the, is, my; "My pup is in the mud."

Vocabulary

tricky word, sentence, capital letter, full stop

Differentiation

- **Support:** learn two tricky words this week (**I** and **the**) and two next week.
- **Stretch:** children draw a picture for one caption and copy the caption underneath.

Teacher notes

- Avoid asking children to memorise tricky words as shapes. Always sound out the part that works first.
- "Is" and "my" are on the Common Core kindergarten list of examples; "I" is needed for the lesson 5 sentence frame.

Lesson 4: Reading our book: Pip and the Mud

Goal: Children read a short decodable book, pointing to each word, and talk about what happens.

Length: about 25 minutes.

Materials

- The large class copy of Pip and the Mud (see the text below).
- One small copy per pair, with the text printed and space for pictures.
- The four tricky-word cards.
- Crayons.

The book (CC0, written for this unit)

Print one page per line. Every word uses only the fourteen taught letters, except the tricky words **I, the, is, my**.

1. I am Dot.
2. Pip is my pup.
3. Pip can dig. Dig, dig, dig!
4. Pip is in the mud.
5. Mud on Pip! Mud on the mat!
6. Dot is sad.
7. Dot gets the cup. Dip, dip. Pat, pat.
8. Mud is not on Pip. Dot is not sad.

Title: **Pip and the Mud**.

Steps

✎ Opening (3 min)

Quick look at the tricky-word cards: **I, the, is, my**.

✎ Main activity 1: read it together (8 min)

Show the large copy. Read the title together, pointing to each word: "Pip... and... the... Mud."

Read each page together. Point under each word from left to right, and show the spaces between words. Children sound out new words: "p-u-p, pup", "g-e-t-s, gets".

Before page 5, check that children know what a **mat** is (a small rug by a door).

✎ Main activity 2: read in pairs (7 min)

Pairs share a small copy. They take turns reading a page each, pointing to every word. The partner listens and helps if asked. Walk round and listen to a few pairs.

Children who are not yet reading on their own follow the pointing while a partner or adult reads.

✓ Discussion questions (with answers) (4 min)

- "Who is Pip?" (Dot's pup.)
- "Why is Dot sad?" (There is mud on Pip and on the mat.)
- "How does Dot fix it?" (She gets a cup and dips and pats Pip.)

✓ Closing check (with answers) (3 min)

Each child draws a picture for one page of their copy. Then point to the words on one page and ask children to read them.

Answers: depend on the page chosen; for example, page 6, "Dot is sad."

Vocabulary

book, title, page, word, space

Differentiation

- **Support:** read pages 1, 2 and 6 only, with an adult pointing.
- **Stretch:** after reading, children write a new last page using taught letters and tricky words (for example, "Pip can nap.").

Teacher notes

- The text is short and a little stilted because it uses only fourteen letters. Talk about the story anyway: children should read for meaning, not just for sounds.
- If children read the book easily, give them more decodable books that match these letters from your school's collection.
- Dot is "she" in the discussion answers; the book itself does not say.

Lesson 5: My first sentence, and show what I know

Goal: Children write (or build) a short sentence with help, and take part in the one-to-one check.

Length: about 25 minutes, plus the one-to-one check spread over the week.

Materials

- Sentence strips with the frame **I can ___.** (one per child).
- Eight picture word cards: **dig, sit, nap, tap, pat, tug, dip, mop** (each with a small picture and the word).
- Magnetic letters and word cards (**I**, **can**, and the eight words) for children who build instead of write.
- Paper, thick pencils or crayons, and mini whiteboards with pens if available. A few lolly sticks to use as spacers, and blocks for counting words.
- For the check: the eight new letter cards (m, o, d, g, c, k, e, u); word cards **cup, dog, ten, mud** with pictures; the four tricky-word cards; a strip saying **The dog is in the mud.**; a record sheet (yes / with help / not yet for each part).

Steps

✎ Opening (3 min)

Read Pip and the Mud together once, from the large copy.

✎ Main activity 1: make a sentence together (7 min)

"I'm going to write a sentence: **I can dig.**" Say it, then count the words on your fingers (three words). Children can instead tap three blocks or touch three lines on the board.

Draw three lines on the board. Write each word on a line, talking as you go:

- "**I** is a tricky word, and always a capital letter."
- "**can**: c-a-n." Children say the sounds with you.
- "**dig**: d-i-g."
- "A full stop at the end."

Point out the **finger spaces** between the words. Children who find a finger awkward can use a lolly-stick spacer or leave a gap the width of a crayon.

✎ Main activity 2: my sentence (10 min)

Each child chooses a picture card and makes their own sentence: **I can ___.** They:

1. Say the sentence out loud (or sign it, or point to the cards).
2. Count the words.

3. Write it on the sentence strip, sounding out the last word, or build it with word cards or magnetic letters.
4. Draw a picture of themselves doing it.

Adults help with sounding out. A child may also tell an adult the sentence, watch the adult write it, and trace or copy it. Any of these counts as writing with help.

✓ Discussion questions (with answers) (3 min)

- "Where does a capital letter go in a sentence?" (At the start, and **I** is always a capital.)
- "What goes at the end?" (A full stop.)
- "Why do we leave spaces?" (So we can see where each word starts and ends.)

✓ Closing check (with answers) (2 min)

Three volunteers read their sentence to the class (only if they want to).

Answers: any "I can ___." sentence with a word from the cards.

One-to-one check (about 4 minutes per child)

Use the record sheet. Mark each part **yes**, **with help** or **not yet**:

1. Shows the eight new letter cards one at a time: **m, o, d, g, c, k, e, u**. The child says the sound or points to the right card when you say it.
2. Shows **cup, dog, ten, mud**. The child blends each word, or picks the matching picture.
3. Shows the tricky words **the, is, I, my** in any order. The child reads them.
4. Shows **The dog is in the mud.** The child reads it, pointing to each word.
5. Says "I can sit." The child writes it, or builds it with word cards or magnetic letters. A capital I, spaces and a full stop are part of this.

Doing it their own way counts as **yes**.

Vocabulary

sentence, capital letter, full stop, finger space

Differentiation

- **Support:** the child builds the sentence with three word cards, then reads it.
- **Stretch:** write a second sentence, for example **My pup can dig.** or **I am Dot.** using their own first name if the letters allow.

Teacher notes

- Accept phonetic spelling: "dg" for "dig" shows the child heard two of the three sounds.

- Do not ask children to write about their own home or family; "I can ___" keeps it about actions.

Grade 1 Language and Literacy: Blend, Read, and Spell

Subject: English language and literacy | Grade: 1 | Lessons: 5 | Time: about 25 minutes each

Status: written (unreviewed) | Author: GPT-6.1 Terra, AI Village

> **Unreviewed AI draft:** no educator review or classroom testing. Not an official standards alignment, a complete reading program, or a diagnostic instrument. Adapt to students and local practice.

Language and literacy progression

Big idea

Letters can stand for sounds. We can blend sounds to read a word, and listen for sounds to help spell one. Reading also means making sense of words.

What students should be able to do

1. Give the taught sounds for lower-case m, s, a, t, p, n, i in this unit's examples.
2. Blend a sequence of taught sounds to read an unfamiliar simple word.
3. Segment a spoken simple word into sounds and represent them with letters.
4. Read a very short controlled text, and answer a question about its meaning.
5. Answer a listening-comprehension question about a separate teacher read-aloud.

What students should already know

Students know that print carries meaning and can attend to and distinguish some speech sounds. At the start, ask them to blend oral /m/ /a/ /t/ and point to where a word begins on a line. If needed, model and practise oral blending and print direction before proceeding. The unit is English-specific; multilingual students bring valuable language knowledge. Speech and print experiences vary.

Lesson list

1. First sounds and blending: m, s, a, t.
2. Change a sound: add p and n; segment and spell.
3. A new vowel: add short i and compare words.
4. Words in a sentence: final /s/, capitals, punctuation, meaning.
5. Review and individual check: a small formative check.

Materials

Large-print letter cards m, s, a, t, p, n, i; a board or paper and marker; individual paper or accessible typing/letter-selection tools. Cards can be large pieces of paper, not small objects. Teacher prepares the original short text in lesson 4 and the check in lesson 5. No pictures are needed to guess words. Provide sufficient space, readable contrast, and appropriate access

supports. Do not require children to touch each other; use safe, supervised materials and follow local school rules.

Assessment

Use lesson 5's private, individual check and answer guide; record each response, self-correction, time and assistance, without a fixed pass score or diagnosis. Use the evidence to plan additional instruction. The listening question is separate from print decoding. Alternative pointing responses can show some recognition, but do not establish unaided oral blending.

Sources

The IES What Works Clearinghouse foundational reading skills practice guide is a general K–3 reference for teaching sound–letter relationships, decoding, and reading connected text. It does not validate this exact sequence or unit. The examples, texts and assessment here are original to this draft; no passage is copied from the guide. Oral language and teacher read-alouds should continue alongside this narrow phonics sequence.

Known gaps and cautions

This small sequence covers only seven letters and selected sounds, not all English sound–letter relationships. English pronunciations vary: use local, familiar examples and accept dialect differences; do not treat an accent as an error. The letters a and i represent the vowel sounds in mat and sit here, not their only sounds. Slash notation such as /a/ and /i/ is teaching shorthand for the vowel sounds in mat and sit, not an IPA transcription; the exact realization varies. Some students need more than one day per lesson and additional systematic instruction. No claim is made about grade-standard alignment, effectiveness, or individual needs. The very short controlled text is deliberately limited and is not a substitute for rich literature or comprehension work.

Lesson 1: First sounds and blending

Time: 25 minutes. Unit overview | Next

Goal

Connect m, s, a and t to their sounds and blend them in simple words.

Materials

Large letter cards, board and marker; paper or accessible response tools.

Steps

1. **Opening and readiness (4 min):** Say /m/ /a/ /t/ slowly and model blending: “mat.” Ask students to try, without print. Point to where to start reading a line. If this is new, practise orally and revisit later; do not treat this quick check as a diagnosis.
2. **Explicit model (6 min):** Show m, s, a, t. Say their sounds: /m/, /s/, short /a/ as in mat, and /t/. Model sustained /m/ and /s/; for /t/ make a brief sound without adding an “uh.” Name letters separately from sounds. Point left to right under m-a-t: /m/ /a/ /t/, “mat.”
3. **Guided practice (7 min):** Build mat, sat, am, at. Point, say sounds, sweep a finger left to right and blend; students follow with a teacher or accessible pointer. Explain each word briefly as needed. Change m to s in mat, blend sat. Do not ask students to guess from a picture.
4. **Discussion (4 min):** “What changed from mat to sat?” Example: “The first letter and sound: m to s.” “What stays?” Example: “a and t.”
5. **Closing check (4 min):** Show sat: expected /s/ /a/ /t/, sat. Ask what sound m makes: /m/. If unsure, model again and practise tomorrow.

Vocabulary

Sound: a speech sound. **Letter:** a written symbol. **Blend:** put sounds together to say a word.

Differentiation

- **Extra support:** Work orally first, then two letters, then three; provide larger print and more time. Reteach individually without public pressure.
- **Extra challenge:** Ask students to explain how mat and sat differ, then use each in an oral sentence. Don't add untaught spelling patterns.

⚠ Safety

Paper or large cards avoid small-object hazards. No student is required to read aloud publicly. Follow local material and accessibility guidance.

Teacher notes

The vowel /a/ here is teaching shorthand for the sound in mat, not IPA transcription or the letter name; pronunciations vary. An accent is not a mistake. Provide an accessible pointing or selection response if speech is inaccessible and record that it checks recognition, not necessarily independent oral blending. Oral meaning and read-alouds continue separately from this short decoding practice.

Lesson 2: Change a sound

Time: 25 minutes. Previous | Unit overview | Next

Goal

Use p and n with the first lesson's letters to read and spell simple words.

Materials

Large m, s, a, t, p, n cards; board; paper or accessible letter selection.

Steps

1. **Opening (4 min):** Review m, s, a, t and blend mat. Reteach as needed.
2. **Model (6 min):** Introduce p /p/ and n /n/. Make /p/ briefly without adding “uh.” Blend m-a-p, map; change m to t and blend tap. Explain the words orally, e.g. a map can show places.
3. **Guided activity (8 min):** Build and read map, tap, pan, man, nap. Say pan, segment /p/ /a/ /n/, and select p-a-n. Students segment nap and choose n-a-p. Say each sound, not a letter name, while segmenting.
4. **Discussion (3 min):** “How did pan become nap?” Example: “The first and last sounds traded places.” Discuss meaning: “What is a nap?” Example: “A short sleep.” Accept other reasonable explanations.
5. **Closing check (4 min):** Read tap (tap); spell spoken man (m-a-n). Model and give another supported attempt if needed.

Vocabulary

Segment: separate a spoken word into its individual sounds. **Spell:** represent a word with letters.

Differentiation

- **Extra support:** Use oral sound practice before cards; model one sound at a time and give more time. Use letter selection if writing is difficult.
- **Extra challenge:** Compare map and tap orally and explain which sound changed. Use each in an oral sentence.

⚠ Safety

Use large paper cards, not small loose parts when unsuitable. No forced public reading; follow school materials guidance.

Teacher notes

Use the short vowel in mat. Accept dialect differences. Multilingual learners may need examples and oral meanings explained; their other languages are assets. A response by

pointing supports participation but measures recognition differently from an independently spoken blend.

Lesson 3: A new vowel

Time: 25 minutes. Previous | Unit overview | Next

Goal

Read and spell words using the vowel sound in sit as well as the sound in mat.

Materials

Large m, s, a, t, p, n, i cards; board; paper or accessible letter selection.

Steps

1. **Opening (4 min):** Review sounds and blend mat and tap. If needed, repeat earlier instruction before introducing another vowel.
2. **Model (6 min):** Introduce lower-case i, the short vowel sound in sit. Model s-i-t /s/ /i/ /t/, “sit.” Contrast sat and sit: the middle letter and sound change. Use examples in the local variety of English.
3. **Guided activity (8 min):** Build and read sit, pin, tin, tip. Say pin, segment /p/ /i/ /n/, and select p-i-n. Students segment and spell tip t-i-p, with support as needed. Explain meanings orally, e.g. a tin is a metal container. Read and compare pan and pin.
4. **Discussion (3 min):** “What changed in pan and pin?” Example: “a changed to i; the middle vowel changed.” “What is the same?” Example: “p and n.”
5. **Closing check (4 min):** Read tin (tin). Spell spoken sit (s-i-t). Model and try again if needed.

Vocabulary

Vowel: a kind of speech sound; here a and i stand for the vowel sounds in mat and sit. Letters can represent different sounds in other words.

Differentiation

- **Extra support:** Use two large contrasting vowel cards and oral practice; allow extra processing time. Offer selection instead of handwriting.
- **Extra challenge:** Explain and use pan and pin in two oral sentences.

⚠ Safety

Use large cards and safe supervised materials. No forced public reading.

Teacher notes

Pronunciation varies by dialect and speaker; do not penalize an accent. When oral speech is inaccessible, pointing can show recognition, but not all the same skills as oral blending. Offer

explanations and oral discussion for multilingual learners without treating language difference as a deficit.

Lesson 4: Words in a sentence

Time: 25 minutes. Previous | Unit overview | Next

Goal

Blend a word with four sounds and read a short controlled text for meaning.

Materials

Large taught-letter cards; board or large-print copy of the original text below.

Steps

1. **Opening (4 min):** Review mat, tap and sit. Blend and explain meanings.
2. **Model (6 min):** Place t-a-p-s. Blend /t/ /a/ /p/ /s/, “taps”: four sounds, including final /s/. Model maps and naps in the same way. Explain that final s is /s/ in these examples, not in every English word. Explain the words orally; a map can show places, a nap is a short sleep.
3. **Read together (7 min):** Teach that capital S and T are forms of s and t; capitals begin the names Sam and Tim and these sentences. A period marks the end. Write and point under each word, blending where needed:

   Sam taps Tim. Tim taps Sam.

Names Sam and Tim use the taught short vowel sounds. Read once together, then offer a private supported reading or accessible response. The text is about light taps; no one has to touch anyone to demonstrate it. 4. **Discussion (4 min):** “Who taps Tim?” Expected: Sam. “Who taps Sam?” Expected: Tim. “Can we tell why?” No, the text does not say. Encourage students to distinguish a possible guess from what the words tell us. 5. **Closing check (4 min):** Read maps (/m/ /a/ /p/ /s/, maps). Ask what the period tells us (the sentence ends). Reteach as needed.

Vocabulary

Sentence: words expressing a thought. **Period:** a mark that can show a sentence has ended. **Capital:** a larger form of a letter used in names and at sentence beginnings.

Differentiation

- **Extra support:** First blend tap, then add /s/. Use large print, a pointer, more time and individual help. Allow selection responses where needed.
- **Extra challenge:** Segment naps into /n/ /a/ /p/ /s/ and explain what can and cannot be inferred from the short text.

⚠ Safety

No forced touch or public reading. Use safe, supervised materials.

Teacher notes

These final s examples all use /s/, but English endings are not always /s/. Avoid “uh” after /t/ and /p/. Respect pronunciation differences. A selection response shows recognition rather than necessarily independent oral reading. This minimal text is not a substitute for listening to rich read-alouds.

Lesson 5: Review and individual check

Time: about 25 minutes of group teaching, plus brief individual checks as time allows. Previous | Unit overview

Goal

Use the taught sound–letter relationships to read and spell, and show understanding of separately heard language.

Materials

Large taught-letter cards, paper or accessible selection tools, individual check cards prepared below, and a teacher recording sheet. Show only one print item at a time. Do not practise the four check words before the check.

Steps

1. **Opening (4 min):** Review sounds m, s, a, t, p, n, i. Blend mat and sit. Give corrective modeling without judging a student's accent.
2. **Model and guided practice (8 min):** Segment map /m/ /a/ /p/ and spell m-a-p. Read taps /t/ /a/ /p/ /s/. Ask students to explain how sounds help them read or spell. Example: “I put the sounds together.”
3. **Listening (5 min):** Teacher reads this original text aloud, not as independent decoding: “A child finds a small plant bent toward a window. The child turns the pot. Later, the plant has bent toward the light again.” Ask: “What did the child turn?” Expected: the pot. “Where did the plant bend later?” Expected: toward the light. Accept equivalent wording.
4. **Discussion (4 min):** “What can you do when a word is unfamiliar?” Example: “Look at its letters, say their sounds, and blend.” Reading for meaning matters too; don't guess words from a picture or first letter.
5. **Closing (4 min):** Together read pin and segment spoken nap: /n/ /a/ /p/. Tell children the next check helps plan teaching, not rank them.

Individual check and answer guide

Conduct privately, with a familiar adult, on another day or while a separate activity is supervised. Allow unhurried response; no timed cutoff. Record each response, self-correction, approximate time if helpful, and any prompts or assistance. No coaching before recording an initial response; support can follow and should be noted. The four real words and two novel strings use only taught letters and patterns, but have not been practised in these lessons.

Show	Expected blend	Expected response
sip	/s/ /i/ /p/	sip
tan	/t/ /a/ /n/	tan
nip	/n/ /i/ /p/	nip
pit	/p/ /i/ /t/	pit
mip	/m/ /i/ /p/	mip (invented item)

Show	Expected blend	Expected response
sim	/s/ /i/ /m/	sim (invented item here; may be a word or abbreviation elsewhere)

Explain that the last two are pretend items for the task, not tests of word knowledge; they can occur in other contexts or languages. They offer a limited look at transfer and do not diagnose a reading difficulty. If an accent changes the expected pronunciation, evaluate the intended taught correspondences in that variety rather than demanding an artificial accent.

Spelling: Say mat, use it in an oral sentence if needed, repeat it, and ask the student to represent its sounds: /m/ /a/ /t/, m-a-t. Repeat with pin: /p/ /i/ /n/, p-i-n. Note whether the student writes, types or selects letters and the support given. These spelling words were practised; this is a separate skill from decoding the check items.

Listening: After the teacher-read text above, ask “What did the child turn?” Expected: the pot. This checks listening to this text, not independent reading. A drawing, gesture or pointing to the pot among teacher-prepared choices can be an accessible response; record the mode and choices used.

Use results: Note which sound, blending step or spelling sound needs more practice. Reteach that element explicitly and check again with different taught items after practice. No arbitrary passing score, diagnosis or placement judgment follows from this small, unvalidated check. Discuss persistent concerns with qualified educators and families using local procedures.

Vocabulary

Self-correction: noticing and changing one's own response. **Assessment:** a way for a teacher to learn what to teach next.

Differentiation

- **Extra support:** Large print, extra time, a quiet setting, or letter selection instead of handwriting. Record all assistance and response mode. If speech is inaccessible, pointing to a word among choices may show recognition but does not establish independent oral blending; document the choices. Multilingual learners can discuss meanings in familiar languages.
- **Extra challenge:** Explain a sound change in mat/sat and make an oral sentence with a practised word, without turning assessment into a speed race.

⚠ Safety

No public ranking or forced public reading; use safe materials and follow school privacy practices for records.

Teacher notes

The check is a small formative snapshot, not validated or comprehensive. Separate listening comprehension, decoding and spelling observations. Use local pronunciation and accessible communication; a different accent is not a reading error. Continue rich oral language and read-alouds alongside phonics.

Grade 1 Language and Literacy: Long Vowel Sounds with Magic e and ee, ai, oa

Subject: English language and literacy | Grade: 1 | Lessons: 5 | Time: about 25 minutes each | Term: 2

Status: written (unreviewed) | Author: Claude Opus 5.5, AI Village

> **Unreviewed AI draft:** no educator review or classroom testing. Not an official standards alignment, a complete reading program, or a diagnostic instrument. Adapt to students and local practice.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 1 year plan - Term 2
Language and literacy progression

Big idea

A vowel letter can stand for more than one sound. In many short words an **e** at the end, or two vowel letters together (**ee**, **ai**, **oa**), tells us to say the vowel's long sound, the one that sounds like its name. Reading the same short book again helps it sound smooth.

Outcomes

By the end of the unit, most children can:

1. Hear whether the vowel sound in a spoken one-syllable word is long or short (for example cap / cape), and show it by saying, pointing or signing.
2. Read short words with a magic e (a_e, i_e, o_e, u_e), such as cape, kite, note and cute, and show how the e changes the word.
3. Read short words with **ee**, **ai** and **oa**, such as seed, paid and goat.
4. Read two new tricky words, said and was, as whole words.
5. Read a short book again until it sounds smoother, and fix a word that did not make sense.

Prior knowledge

The unit uses words built only from letters already taught in kindergarten and in the grade 1 term 1 unit: **s a t i p n m o d g c k e u**, and the tricky words I, the, is, my. Children should be able to blend three or four sounds into a short word such as mat or dust.

At the start of lesson 1, check: can the child blend s-a-t, p-i-n and c-u-t, and say the sound for each of a, i, o, u, e? If a child cannot yet blend, keep working on that first; this unit adds to blending, it does not replace it.

Lessons

1. Long and short vowel sounds: listening only; cap or cape?
2. Magic e with a and i: cap becomes cape, pin becomes pine.
3. Magic e with o and u, and two tricky words: not becomes note; said, was.

4. ee, ai, oa: two letters, one long sound.
5. Reading a book again until it sounds smooth: "Goat and the Kite", read three times, and a private one-to-one check.

Materials (whole class unless noted)

- Large-print letter cards for s, a, t, i, p, n, m, o, d, g, c, k, u, and a separate **magic e card** (a large e on a card of a different colour, with a raised edge or a strip of tape so it can be felt).
- Two **long and short cards**: a long strip of card (about 40 cm) and a short square (about 8 cm). Different lengths can be felt as well as seen.
- A small long and short pair (a long and a short strip of paper) for each child or pair (lesson 1).
- Large-print word cards for each lesson (listed in each lesson).
- Three vowel-team cards, **ee**, **ai** and **oa**, each with both letters on one card (lesson 4).
- Two tricky-word cards, said and was, with one rounded cut corner so they can be told apart by touch (lesson 3).
- The one-to-one check card (in lesson 5).
- Mini whiteboards and pens, or paper and pencils (one per child), or the child's usual typing or letter-selection tool.
- The book "Goat and the Kite" (text in lesson 5): one printed copy per pair, plus one large copy for the board. Copies are made by the teacher from the text; there is no publisher.
- Optional: braille or large-print copies of the word cards and the book for children who use them, made with the child's braille teacher or vision service.
- A quiet corner and a simple record sheet for the one-to-one check (lesson 5).

⚠ Safety and access

- Cards are large pieces of card, not small objects; nothing small enough to swallow is needed.
- **Deaf and hard-of-hearing children:** hearing a long or short vowel depends on sound. Sit the child close, face them so they can see the mouth, and use the child's usual hearing technology. The long and short cards give a visual and touchable signal. If listening is not accessible for a child, focus on the print outcomes (2–4) and agree with the child's specialist teacher how sound work is done; do not mark outcome 1 as "not yet" because of hearing.
- **Children who sign:** in a signing classroom, follow the school's approach to linking signs, fingerspelling and print.
- **Non-speaking children:** any answer can be given by pointing to a card, choosing on an AAC device, signing, or holding up the long or short card. Pointing shows they recognise a word; it does not show blending aloud, and the record should say which was used.
- **Blind and low-vision children:** large print with strong contrast, or braille made with the child's braille teacher (braille may show some words in contracted form, so follow that teacher's advice). The magic e card and the long and short cards can be told apart by touch.
- **Colour:** the magic e card is a different colour, but it also has a raised edge, so colour is never the only clue.
- **Fine motor:** children may say, point, or choose letter cards instead of writing.

- **Reading aloud is never forced in front of the class.** No timing of reading in public, no reading-speed charts, and no rankings. Reading alone to an adult happens privately, in lesson 5.
- Accents differ. Accept the long and short vowel sounds of the child's own way of speaking English.

Assessment

- **Every lesson:** a short closing check (in each lesson file) for the teacher to note who might need more practice.
- **Lesson 5:** a private one-to-one check, about 3 minutes per child, covering all five outcomes: long or short (outcome 1); reading four magic e words (outcome 2); reading three vowel-team words (outcome 3); reading said and was (outcome 4); and reading one page of the book again, with any self-correction noted (outcome 5).
- Record what each child did and what helped, with no score or pass mark. Use the record to plan who needs more practice with which pattern.
- A child who answered by pointing or AAC is recorded as doing so; this is a valid answer, not a lesser one.

Sources

- Common Core State Standards, Reading: Foundational Skills, Grade 1 (archived copy, 5 April 2025): https://web.archive.org/web/20250405094820/https://www.thecorestandards.org/ELA-Literacy/RF/1/
  - RF.1.2.a: "Distinguish long from short vowel sounds in spoken single-syllable words."
  - RF.1.3.b: "Decode regularly spelled one-syllable words."
  - RF.1.3.c: "Know final -e and common vowel team conventions for representing long vowel sounds."
  - RF.1.3.g: "Recognize and read grade-appropriate irregularly spelled words."
  - RF.1.4.b: "Read grade-level text orally with accuracy, appropriate rate, and expression on successive readings."
  - RF.1.4.c: "Use context to confirm or self-correct word recognition and understanding, rereading as necessary."
- Wikipedia, "Phonics": https://en.wikipedia.org/wiki/Phonics
  - Long vowels "have the same sound as the names of the vowels", and "The way that educators use the term 'long vowels' differs from the way in which linguists use this term."
  - Vowel-consonant-e spellings are "often referred to as 'the silent E' or 'the magic E'", with examples including bake, hike, cone and cute; the ee spelling "is sometimes, but inconsistently, considered part of this pattern."
  - "The ai in sail is a vowel digraph." The rule "when two vowels go walking, the first one does the talking" has "been almost universally discarded owing to the many non-examples".
- IES What Works Clearinghouse, Foundational Skills to Support Reading for Understanding in Kindergarten Through 3rd Grade (practice guide landing page only): https://ies.ed.gov/ncee/wwc/PracticeGuide/21 . A general reference for linking sounds to letters, teaching decoding, and having each child read connected text every day. It does not validate this exact unit.
- The word lists, the long and short cards, and the book "Goat and the Kite" are original to this draft (CC0).

Known gaps

- Written 10 November 2026. Text-checked by one other agent (Gemini 4 Argon, 10 November 2026, 0 errors reported plus optional materials-list notes, which were applied and which Gemini 4 Argon also diff-checked the same day; see PEERCHECKS.md); not yet reviewed by a teacher. A text check is not classroom testing.
- **Letters this unit assumes.** The grade 1 year plan expects term 1 to add the remaining single letters and sh, ch, th. The written term 1 unit teaches m, s, a, t, p, n, i, and kindergarten taught s, a, t, i, p, n, m, o, d, g, c, k, e, u. So this unit uses only those letters. Words with b, f, h, l, r, w and others (rain, boat, feet, ride) are left out until those letters have been taught; a teacher who has taught them can add such words.
- Magic e with e (e_e, as in theme) is not taught here, because there are few short, common examples; ee is taught instead.
- Other long vowel spellings (ay, igh, ow, ue, ea and others) are not covered and would follow later.
- The tricky words said and was are an example, not taken from a source list.
- The one-to-one check is a classroom note-taking tool, not a reading test or screening.

Lesson 1: Long and Short Vowel Sounds

Unit overview - Next: Lesson 2

Goal: Children hear whether the vowel sound in a spoken word is short (as in cap) or long, sounding like the letter's name (as in cape).

Length: 25 minutes

Materials

- The long and short cards (long strip and short square) for the teacher, plus one small pair per child or pair (strips of paper cut long and short work).
- Letter cards a, i, o, u.
- Optional: the child's usual hearing technology; tactile long and short cards.

Steps

✎ Opening (3 min)

Say: "Vowels are letters like a, i, o, u. Each one can make a short sound and a long sound. The long sound sounds like the letter's name." Hold up a: "Short: /a/ as in cap. Long: like its name, as in cape." (Slash letters here are teaching shorthand, not IPA.)

Warm-up: prior-knowledge check (4 min)

Blend aloud together: s-a-t, p-i-n, c-u-t. Hold up a, i, o, u in turn; children say or sign the short sound. Note anyone who cannot yet blend (see README, Prior knowledge).

✎ Main activity: long or short? (12 min)

1. Model with the big cards: say cap and hold up the short square; say cape and hold up the long strip. Stretch the vowel a little without distorting it.
2. Say each pair. Children hold up the short or long card for each word:
    - cap / cape
    - pin / pine
    - hop / hope
    - cut / cute
3. Then say single words in a mixed order and children show long or short: kite (long), sun (short), note (long), pig (short), made (long), mop (short).
4. Pairs take turns: one says cap or cape (pointing to the card so the partner can check), the other shows long or short.

These listening words may include letters the children cannot read yet; this lesson is listening only.

✓ Discussion questions (with answers) (3 min)

- "In cape, does the a sound like its name?" Yes.
- "Is the sound in pin long or short?" Short.
- "Which word has the long sound, hop or hope?" hope.

✓ Closing check (with answers) (3 min)

Say four words; children show the short or long card: cut (short), cute (long), pine (long), cap (short). Note who is unsure for more practice.

Vocabulary

vowel, long sound, short sound

Differentiation

- **More support:** work with one vowel (a) only; exaggerate the length slightly; repeat each pair twice.
- **Stretch:** children think of their own word with a long sound (any answer that has one counts).
- **Access:** non-speaking children show the card or choose on AAC; deaf and hard-of-hearing children sit close, watch the mouth and use their usual technology (see README, Safety and access); blind children feel the long and short cards.

⚠ Safety

The cards are large and flat. Accept the child's own accent.

Lesson 2: Magic e with a and i

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children read words with a_e and i_e and show how adding e changes a short vowel to a long one.

Length: 25 minutes

Materials

- Letter cards c, a, p, t, m, d, n, i, k, and the magic e card.
- Large word cards: cap, cape, tap, tape, mad, made, can, cane, pin, pine, kit, kite, dim, dime.
- Mini whiteboards and pens or paper and pencils (one per child), or the child's usual tool.
- The long and short cards.
- Optional: braille or large-print word cards; tactile magic e card.

Steps

✎ Opening (3 min)

Review lesson 1: say cap and cape; children show short or long.

Warm-up (4 min)

Build cap with letter cards. Everyone blends it. Then add the magic e card at the end: "This e makes no sound of its own here. It tells the a to say its name." Blend cape together.

✎ Main activity (12 min)

1. Change and read. With the cards, build each short word, read it, add the magic e, and read the new word: tap → tape, mad → made, can → cane. Then the i words: pin → pine, kit → kite, dim → dime.
2. Sort. Show the word cards one at a time, mixed. Children read each word and show long or short.
3. Write. Say tape; children write it (or choose letter cards). Then pin, kite, made. Check together: does it end in e if the sound is long?

The name "magic e" is what many teachers say (see Sources); it is not really magic, just a spelling pattern that works in many short words.

✓ Discussion questions (with answers) (3 min)

- "What changed when we added e to pin?" It became pine; the i said its name.
- "Does the e at the end of kite make a sound?" No, it is silent.

- "Kit or kite: which has a long sound?" kite.

✓ Closing check (with answers) (3 min)

Show four cards; children read each one aloud together or by signing (non-speaking children: lay out the four cards, say one word, and the child points to it): cane, dim, tape, kite. Then: "Which ones have a magic e?" cane, tape, kite.

Vocabulary

magic e, silent, long sound

Differentiation

- **More support:** stay with a_e only; build each word with the cards before reading the card.
- **Stretch:** read mane, date, time, side (all use taught letters).
- **Access:** children who do not write choose letter cards or type; non-speaking children read by pointing when the teacher says a word; blind children use braille or tactile cards (follow the braille teacher's advice).

⚠ Safety

Large flat cards only.

Lesson 3: Magic e with o and u, and Two Tricky Words

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children read words with o_e and u_e, and read the tricky words said and was as whole words.

Length: 25 minutes

Materials

- Letter cards n, o, t, c, d, u, s, m, p, k, and the magic e card (p and k are for building poke in More support).
- Large word cards: not, note, cod, code, cut, cute, us, use, cone, poke, tune, dome; the review words cape, kite, pin from lesson 2; and the two tricky word cards said and was (a different shape of card, for example with a cut corner, so they can be told apart by touch as well as sight).
- Mini whiteboards and pens or paper and pencils (one per child), or the child's usual tool.
- The long and short cards.
- Optional: braille or large-print word cards.

Steps

✎ Opening (3 min)

Quick review: read cape, kite, pin together. Which have a magic e?

Warm-up (4 min)

Build not with letter cards, read it, add the magic e: note. "The magic e works with o too." Then cut → cute: "And with u. Long u can sound like its name, you."

✎ Main activity 1: o_e and u_e (8 min)

1. Change and read with the cards: cod → code, us → use.
2. Read the word cards cone, poke, tune, dome together. Children show long or short for each (all long).
3. Mixed sort: not, note, cut, cute, code. Children read each one and show long or short. Answers: short, long, short, long, long.

✎ Main activity 2: two tricky words (4 min)

Show said. "Some words don't follow the patterns we know, so we learn them as whole words. This one says said." Read it, spell it aloud together, write it once. Then the same for

was. Put both on the class tricky-word wall next to I, the, is, my. (These two words are an example; a school may use its own list.)

✓ Discussion questions (with answers) (3 min)

- "What does the e do in note?" It makes the o say its name; it is silent.
- "Can we sound out said with our letter sounds?" Not with the sounds we know; we learn it as a whole word.
- "Which is long, us or use?" use.

✓ Closing check (with answers) (3 min)

Show cute, not, said, code. Children read them together or by signing (non-speaking children: lay out the cards, say one word, the child points to it). Answers: cute (long), not (short), said (tricky word), code (long).

Vocabulary

magic e, tricky word, long sound

Differentiation

- **More support:** o_e only; build every word from cards first; practise said only.
- **Stretch:** read mute, dune, tone, mope.
- **Access:** non-speaking children point; blind children use braille or tactile cards, and feel the cut corner of the tricky-word cards; children who do not write choose letter cards.

⚠ Safety

Large flat cards only. The cut corner is rounded, not sharp.

Lesson 4: ee, ai, oa

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children read words in which two vowel letters together (ee, ai, oa) make one long vowel sound.

Length: 25 minutes

Materials

- Three large team cards: **ee**, **ai**, **oa** (each two letters on one card).
- Letter cards s, d, n, m, t, p, g, c, k.
- Large word cards: see, seed, need, meet, deep, seem; aim, maid, paid, pain, main; goat, coat, soap, toad, oak, moat; the review words kite, note, cute (Opening); and mat (Closing check).
- Mini whiteboards and pens or paper and pencils (one per child), or the child's usual tool.
- The long and short cards.
- Optional: braille or large-print word cards.

Steps

✎ Opening (3 min)

Read kite, note, cute together. "Today we find another way to write long sounds: two vowel letters together."

Warm-up (4 min)

Show the **ee** card: "These two letters together make one sound, the long e." Build s + ee → see, then s + ee + d → seed.

✎ Main activity (12 min)

1. **ee** (3 min): read need, meet, deep, seem together. Build one with cards.
2. **ai** (3 min): show the ai card: "long a, like its name." Read aim, maid, paid, pain, main.
3. **oa** (3 min): show the oa card: "long o." Read goat, coat, soap, toad, oak, moat.
4. **Write** (3 min): say seed, paid, goat; children write them (or choose cards) and check together.

Some children may have heard "when two vowels go walking, the first one does the talking". Do not teach it: Wikipedia's Phonics article notes it has been almost universally discarded because so many words break it. Instead say: "These teams make long sounds in these words. We'll learn other teams later."

✓ Discussion questions (with answers) (3 min)

- "How many sounds does ee make in seed?" One (the long e).
- "Which team is in paid?" ai.
- "Is the o in goat long or short?" Long.

✓ Closing check (with answers) (3 min)

Show meet, main, coat, mat. Children read them together or by signing (non-speaking children: lay out the cards, say one word, the child points to it), then show long or short. Answers: long, long, long, short.

Vocabulary

vowel team, long sound

Differentiation

- **More support:** teach ee only today and ai and oa the next day; build every word from cards first.
- **Stretch:** read seen, teen, coast, toast.
- **Access:** non-speaking children point; blind children use braille or tactile cards (in contracted braille some of these words may look different; follow the braille teacher); children who do not write choose cards.

⚠ Safety

Large flat cards only. No real soap or food is needed; the words are just words.

Lesson 5: Reading a Book Again Until It Sounds Smooth

Unit overview - Previous: Lesson 4

Goal: Children read a short book three times, noticing that it sounds smoother each time, and fix a word that does not make sense. The teacher does a private one-to-one check.

Length: 25 minutes for the class lesson, plus about 3 minutes per child for the one-to-one check (during the lesson's quiet reading or at other times in the week)

Materials

- "Goat and the Kite" (text below): one printed copy per pair and one large copy for the board.
- The check card: the words from the one-to-one check below (tape, pine, note, cute, seed, paid, goat, said, was) on one card, plus the same words on single word cards for children who point. A record sheet with each child's name.
- The long and short cards.
- Optional: braille or large-print copies of the book and check card.

The book: "Goat and the Kite"

Original to this draft (CC0), set in Little Hill. It uses only the letters s a t i p n m o d g c k e u and the tricky words the, is, I, said. One line per page:

1. Goat made a kite.
2. The kite is tan and pink.
3. Goat and Duck sit on the dune.
4. The kite is up in the mist!
5. Snap! The kite is stuck in an oak.
6. Goat is sad. Duck is sad.
7. Duck said, "I can poke it."
8. Duck pokes it. Pop! The kite is not stuck.
9. Goat and Duck sit in the sun. The end.

Long vowel words in the book: Goat, made, kite, dune, oak, poke, pokes.

Steps

✎ Opening (3 min)

Show the cover title. Children find the long vowel words in the title: Goat (oa), kite (magic e).

First reading: teacher reads (4 min)

The teacher reads the large copy aloud, pointing to each word. Ask: "What went wrong for Goat?" (The kite got stuck in an oak.)

Second reading: together (5 min)

Read together as a class, the teacher pointing. Stop at made, dune and poke and ask: "Which letter tells us the vowel is long?" (The e at the end.)

Third reading: in pairs (7 min)

Pairs read the book together, taking turns by page, or reading it together in one voice. Children may whisper. The teacher listens to a few pairs and starts the one-to-one checks.

Teach one fix-up step: "If a word doesn't make sense, stop, look again, and read the sentence again." Model it once: read "Goat made a kit" and say, "Hmm, that doesn't make sense with the picture in my head. Look again: kite!"

✓ Discussion questions (with answers) (3 min)

- "Did the book sound smoother the third time?" Any honest answer; many children notice it gets easier.
- "How did Duck help?" Duck poked the kite and it came unstuck.
- "Find a word with oa." Goat or oak.

✓ Closing check (with answers) (3 min)

Point to kite, oak, sun, said on the large copy. Children read them together or by signing, and show long or short for the first three. Answers: kite long; oak long; sun short; said is a tricky word.

One-to-one check (about 3 minutes, private)

In a quiet corner, one child at a time. Explain it is just to help the teacher plan. Note what the child does and what helped; no score.

1. **Long or short (outcome 1):** say cap, cape, hope. The child shows long or short. (Answers: short, long, long.)
2. **Magic e (outcome 2):** the child reads tape, pine, note, cute.
3. **Vowel teams (outcome 3):** the child reads seed, paid, goat.
4. **Tricky words (outcome 4):** the child reads said and was.
5. **Rereading (outcome 5):** the child reads page 7 or 8 of the book again; note any self-correction.

Non-speaking children: lay out three cards, say one word, and the child points to it; record "pointing". Blind children use the braille or large-print check card. Deaf children: see the README note on outcome 1.

Vocabulary

reread, smooth, make sense

Differentiation

- **More support:** the child echo-reads each page after the teacher.
- **Stretch:** the child writes one more page for the book using the words from this unit (any spelling attempt counts).
- **Access:** reading aloud alone is never done in front of the class; children who do not speak read with a partner by pointing to each word.

⚠ Safety

No timing of reading, no speed charts and no rankings. The check is private.

Grade 1 Language and Literacy: Two-Syllable Words, -s -ing -ed Endings, a Recount and a Fact Page

Subject: English language and literacy | Grade: 1 | Lessons: 5 | Time: about 25 minutes each | Term: 3

Status: written (unreviewed) | Author: Claude Opus 5.5, AI Village

> **Unreviewed AI draft:** no educator review or classroom testing. Not an official standards alignment, a complete reading program, or a diagnostic instrument. Adapt to students and local practice.
>
> Text-checked by one other agent (DeepSeek-V4-Pro); see Known gaps.

Back to the grade 1 year plan - Term 3
Language and literacy progression

Big idea

Longer words are made of parts. Every beat (syllable) in a word has a vowel sound, so we can read a long word one part at a time, and endings such as -s, -ing and -ed change what a word tells us. Writers put events in order with time words, and a fact page tells a reader true things about one topic.

Outcomes

By the end of the unit, most children can:

1. Count the beats (syllables) in a spoken word, and find the vowel in each part of a printed two-syllable word such as sunset or picnic.
2. Read two-syllable words by splitting them into parts, for example nap + kin = napkin.
3. Read a root word with the endings -s, -ing and -ed (for example pick, picks, picking, picked) and say which one tells about something that already happened.
4. Tell, then write, a short recount of three events in order, using time words (first, next, then, at the end), with an ending and a full stop at the end of each sentence.
5. Make a short fact page that names a topic, gives two or three facts from a source the class shared, and has a closing line.

Prior knowledge

Children should be able to read short words with the letters **s a t i p n m o d g c k e u**, magic e words and ee, ai, oa words (the grade 1 term 2 unit), and the tricky words I, the, is, my, said, was. They should be able to write a sentence with a capital letter and a full stop (term 1).

All the words children are asked to **read** in this unit use only those letters and patterns. Words children **say** or **write** in their own recounts and fact pages can use any letters; invented spelling is expected and accepted.

Lessons

1. Beats in words: clapping syllables; every part has a vowel; sun + set = sunset.
2. Endings -s, -ing and -ed: pick, picks, picking, picked; what already happened.
3. Telling what happened, in order: a Little Hill picture story told with first, next, then, at the end.
4. Writing a recount: three sentences, a partner's question, and one added detail.
5. A fact page, and a private check: facts about ducks from a card the teacher reads aloud; a one-to-one check.

Materials (whole class unless noted)

- Large word cards for each lesson (listed in each lesson), and the same words split into two part cards (for example sun and set) for lesson 1.
- Ending cards **-s**, **-ing** and **-ed**, each on a card of a different colour with a different edge (straight, wavy, notched) so they can be told apart by touch (lesson 2).
- Four time-word cards: first, next, then, at the end (lessons 3 and 4).
- Four large picture cards for "Duck's Picnic" (described in lesson 3); a teacher can draw simple pictures or use the text descriptions.
- One small paper set of the four picture cards per pair (lessons 3 and 4).
- Optional writing frames with the time words or sentence starters already written (lessons 4 and 5).
- The duck fact card (text in lesson 5), one large copy for the board.
- Mini whiteboards and pens, or paper and pencils (one per child), or the child's usual typing or letter-selection tool.
- Writing paper with space for a picture (one sheet per child for lesson 4, one for lesson 5).
- The one-to-one check card (in lesson 5) and a simple record sheet.
- Optional: a counter or block per child for touching beats (lesson 1).
- Optional: braille or large-print copies of the word cards, time-word cards and fact card, made with the child's braille teacher or vision service; tactile versions of the picture cards (for example a felt or card cut-out on each).

⚠ Safety and access

- **No personal recounts are required.** Every recount in this unit is about the shared made-up story "Duck's Picnic". A child may choose to write about a class event everyone shared instead. Children are never asked to write or tell about home, family, weekends, holidays or trips.
- **Writing can be done in the child's own way:** by hand, by typing, by letter selection on an AAC device, or by telling an adult who writes the words down (dictation). Drawing plus a spoken or signed sentence also counts in lessons 3 to 5.
- **Clapping beats** can also be tapping, nodding, stamping, signing a count, or touching a counter for each beat. Deaf and hard of hearing children can feel beats as taps on the table or the back of the hand, and should not be marked "not yet" on outcome 1 because of hearing; use the printed-word part of the outcome and the child's usual communication.
- **No public reading aloud is required.** Sharing with the class is always optional; a child can share with one partner or with the teacher only.

- Braille note: in contracted (UEB grade 2) braille, some endings such as -ing and -ed have their own contraction signs. Agree with the child's braille teacher whether to use contracted or uncontracted braille for this unit.
- No food is used. The picnic is only in the story.

Assessment

- Lessons 1 to 4 each end with a short closing check (whiteboards, cards or pointing), used only to plan the next lesson.
- Lesson 5 ends with a private one-to-one check of about three minutes covering all five outcomes. It is not a test, it is not timed, and results are not shared with the class.
- The lesson 4 recount and lesson 5 fact page are kept as samples. Look for: events in order, at least one time word, a closing sentence, full stops; spelling that shows the sounds (picnik for picnic is a good sign at this stage).

Sources

- Common Core State Standards, Reading: Foundational Skills, Grade 1 (archived copy): RF.1.3.d "Use knowledge that every syllable must have a vowel sound to determine the number of syllables in a printed word."; RF.1.3.e "Decode two-syllable words following basic patterns by breaking the words into syllables."; RF.1.3.f "Read words with inflectional endings." https://web.archive.org/web/20250405094820/https://www.thecorestandards.org/ELA-Literacy/RF/1/
- Common Core State Standards, Language, Grade 1: L.1.4.c "Identify frequently occurring root words (e.g., look) and their inflectional forms (e.g., looks, looked, looking)."; L.1.1.e "Use verbs to convey a sense of past, present, and future (e.g., Yesterday I walked home; Today I walk home; Tomorrow I will walk home)."; L.1.2.b "Use end punctuation for sentences."; L.1.2.e "Spell untaught words phonetically, drawing on phonemic awareness and spelling conventions."
- Common Core State Standards, Writing, Grade 1: W.1.3 "Write narratives in which they recount two or more appropriately sequenced events, include some details regarding what happened, use temporal words to signal event order, and provide some sense of closure."; W.1.2 "Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure."; W.1.5 "With guidance and support from adults, focus on a topic, respond to questions and suggestions from peers, and add details to strengthen writing as needed."; W.1.8 "With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question."
- Wikipedia, "English verbs" (how the -ed ending is pronounced): https://en.wikipedia.org/wiki/English_verbs
- Wikipedia, "Duck" (facts on the lesson 5 fact card): https://en.wikipedia.org/wiki/Duck

The story "Duck's Picnic", the fact card wording and all example word lists were written for this unit (CC0). They are examples, not taken from a source.

Known gaps

- Written 10 November 2026. Text-checked by one other agent (DeepSeek-V4-Pro, 10 November 2026, 0 errors reported; see PEERCHECKS.md); not yet reviewed by a teacher. A text check is not classroom testing.

- **Letters.** As in the term 2 unit, words children read use only the letters known to have been taught in the written kindergarten and grade 1 units. Many common words for these skills (jump, look, rabbit, basket) need letters such as b, f, h, j, l, r, w; a teacher who has taught them can add such words.
- The time words first, next and then use letters not yet taught (f, r, x, h), so they are learned by sight from cards with a small symbol and read with the teacher, not sounded out.
- Endings that change the spelling of the root (hop, hopping, hopped; make, making) are not taught here; every root word used keeps its spelling when an ending is added.
- The three sounds of -ed are taught as a listening idea only; children are not asked to name or sort them.
- The writing samples are not marked against a rubric or level.

Lesson 1: Beats in Words

Unit overview - Next: Lesson 2

Goal

Children count the beats (syllables) in spoken words, see that each part of a printed word has a vowel, and read two-syllable words one part at a time.

Length

About 25 minutes.

Materials

- Large word cards: sunset, picnic, magnet, napkin, kitten, insect, pumpkin, dentist.
- The same words cut into two part cards each (for example sun | set), with the vowel in each part printed a little larger.
- Mini whiteboards and pens or paper and pencils (one per child), or the child's usual tool.
- Optional: braille or large-print part cards; a counter or block per child for touching a beat.

Steps

✎ Opening (3 min)

Say: "Some words are short, like cat. Some are longer, like picnic. Today we find out how to read longer words one part at a time."

Warm-up: clap the beats (4 min)

Say each spoken word and clap once for each beat, then the children copy: duck (1), goat (1), sunset (2), picnic (2), kitten (2), pumpkin (2). Children may clap, tap, nod, stamp, sign a number or touch a counter for each beat; any of these counts.

✎ Main activity: every part has a vowel (12 min)

1. Put up sun and set as two part cards. Point to the vowel in each: "Sun has **u**. Set has **e**. Each part has a vowel sound." Blend each part, then push the cards together: sun, set, sunset.
2. Do the same with pic | nic, mag | net, nap | kin.
3. Show a whole word card, kitten. Ask: "Where do we split it?" Children point to each vowel first, then the teacher shows the split kit | ten. A useful tip for these words (an example, not a full rule): when two consonants sit between two vowels, split between them.
4. In pairs, children try insect, pumpkin and dentist: find the vowels, split, read each part, read the whole word. Pairs show the split on a whiteboard with a line, or by pointing.

✓ Discussion questions (3 min)

- How many beats does picnic have? How many vowels can you see?
- Why is it easier to read pumpkin in two parts?

✓ Closing check (3 min)

Show napkin and magnet one at a time. Each child shows the number of beats (fingers, a sign, or a count of taps) and reads the word, or points to where it splits. Note who needs more practice splitting.

Vocabulary

beat, syllable, vowel, part, split

Differentiation

- **Support:** work with part cards only, already split; the child reads each part and an adult pushes the cards together.
- **Stretch:** read contest, upset and catnip and split them without help.
- **Non-speaking children:** point to each part as the adult reads it, then point to the whole word when the adult asks "Which word is sunset?"

⚠ Safety

No special safety needs. Stamping for beats is optional and done standing in place.

Lesson 2: Endings -s, -ing and -ed

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal

Children read root words with the endings -s, -ing and -ed, and know that -ed often tells us something already happened.

Length

About 25 minutes.

Materials

- Large root word cards: pick, kick, stamp, mend, dust, test, open.
- Ending cards **-s**, **-ing** and **-ed** (different colours and edges: straight, wavy, notched).
- Large word cards for the closing check: kicks, mending, picked.
- Mini whiteboards and pens or paper and pencils (one per child), or the child's usual tool.
- Optional: braille or large-print root word and ending cards.

Steps

✎ Opening (3 min)

Act it out: pretend to pick a flower from the air. Say: "I **pick**." Keep going: "I am **picking**." Stop: "I **picked** a flower." Ask: "What changed in the word?"

Warm-up: root word plus ending (4 min)

Show pick. Add the **-s** card: picks. Swap to **-ing**: picking. Swap to **-ed**: picked. Say: "Pick is the root word. The ending changes what the word tells us." Children read each one with you, or point to the ending as you read.

✎ Main activity: build and read (12 min)

1. With kick, stamp and mend, the teacher holds up the root word and a child chooses an ending card to add. Everyone reads the new word (kicks, stamping, mended and so on).
2. **Yesterday, today, tomorrow.** Say sentences about Duck, and children show with a thumb pointed back over their shoulder (or point to a "before" side of the room, or sign) when it already happened:
    - "Today Duck picks a seed."
    - "Yesterday Duck picked a seed." (thumb back)
    - "Tomorrow Duck will pick a seed."
3. **Listening note for the teacher.** The -ed ending is said in three ways. After a t or d sound it adds a new beat: mended, dusted, tested. After some other sounds it sounds like /t/: picked, kicked, stamped. Otherwise it sounds like /d/: opened, seemed. (Slashes

here are teaching shorthand, not IPA; these word examples are ours.) Say a few and let children clap the beats: mend (1), mended (2); pick (1), picked (still 1). Children do not need to name or sort the three sounds; the spelling is always -ed.
4. On whiteboards, children write a root word the teacher says (dust, test or open) and add an ending of their choice, then show a partner. Any root-plus-ending they read correctly counts.

✓ Discussion questions (3 min)

- Which ending tells us something already happened?
- Mended has two beats but picked has one. Can you hear the difference?

✓ Closing check (3 min)

Show kicks, mending and picked one at a time. Children read each word (aloud, signed, or by pointing to it when the teacher says it), and then point to the one that "already happened". Note who reads the root but not the ending.

Vocabulary

root word, ending, already happened, yesterday, today, tomorrow

Differentiation

- **Support:** cover the ending with a hand, read the root, then uncover and add the ending sound.
- **Stretch:** read seemed, aimed and tested and say which has two beats.
- **Non-speaking children:** the teacher reads three forms aloud; the child points to the card that matches.

⚠ Safety

Acting out "kick" and "stamp" is done in place, in the air or on the floor, never toward another child.

Lesson 3: Telling What Happened, in Order

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal

Children retell a short made-up story in order, out loud or in their own way, using the time words first, next, then and at the end, and talking about it as something that already happened.

Length

About 25 minutes.

Materials

- Four large picture cards for "Duck's Picnic" (below), drawn simply or shown as the text descriptions.
- Four time-word cards: first, next, then, at the end. These words use letters not yet taught, so each card also has a small symbol (1 dot, 2 dots, 3 dots, a star) and the teacher reads them; children learn them by sight, not by sounding out.
- One small set of the four picture cards per pair (paper copies are fine).
- Optional: tactile picture cards (for example a felt seed on card 1, a stick on card 3), and braille or large-print time-word cards.

The story: "Duck's Picnic" (CC0, written for this unit)

The teacher tells this story; children do not read it. It uses letters not yet taught (for example h, l, w, b), which is fine for listening and retelling.

1. Duck packed seeds and a napkin in a bag.
2. Duck and Goat went down the hill to the pond.
3. The wind blew the napkin into the pond! Goat got it out with a stick.
4. Duck and Goat sat on the wet napkin and ate the seeds. It was a good picnic.

Steps

✎ Opening (3 min)

Say: "When we tell what happened, we tell it in order, so the listener can follow. Today we tell a story about Duck."

Warm-up: what already happened? (4 min)

Tell the story once, showing the cards in order. Then say a few sentences and ask whether they tell what already happened: "Duck packed seeds." (yes) "Duck packs seeds." (now) Children show with a thumb back over the shoulder for "already happened", as in lesson 2.

✎ Main activity: time words (8 min)

1. Put up the four time-word cards above the pictures, in order. Read them together: first, next, then, at the end.
2. Model one retelling: "**First**, Duck packed seeds and a napkin. **Next**, Duck and Goat went to the pond. **Then** the wind blew the napkin into the pond, and Goat got it out. **At the end**, they sat on the wet napkin and ate the seeds."
3. Mix up the picture cards. Children help put them back in order, saying or pointing to the time word for each.

Pairs: tell it your way (4 min)

In pairs, children put their small picture cards in order and take turns telling the story with the time words. A child can tell it by speaking, signing, using an AAC device, or by pointing to each card while their partner or an adult says it. Adding a made-up detail is welcome ("The seeds were pink").

✓ Discussion questions (3 min)

- Which time word goes at the start? Which goes at the end?
- What would be confusing if we told card 4 first?

✓ Closing check (3 min)

Show the four pictures mixed up. Each child (or pair) puts them in order and touches a time word for each, or tells one sentence with a time word. Note who can order the events and who uses time words.

Vocabulary

first, next, then, at the end, in order, recount

Differentiation

- **Support:** use only three cards (1, 3, 4) and three time words (first, then, at the end).
- **Stretch:** add a sentence about how Duck or Goat might have felt, using "might" (for example "Goat might have felt proud").
- **Blind or low-vision children:** use tactile picture cards and braille or large-print time-word cards; order them by touch.

⚠ Safety and care

Children are not asked to tell about their own weekend, home or family. If a child offers a personal story, thank them and return to Duck.

Lesson 4: Writing a Recount

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal

Children write a short recount of "Duck's Picnic" (at least three events in order) with time words, a full stop at the end of each sentence and an ending, then add one detail after a partner's question.

Length

About 25 minutes.

Materials

- The four "Duck's Picnic" picture cards and the four time-word cards from lesson 3, on the board.
- A word bank on the board children can copy from: Duck, Goat, seeds, napkin, pond, stick, picnic, packed.
- Writing paper with space for a picture (one sheet per child), and pencils, or the child's usual typing or letter-selection tool.
- Optional: small sets of picture cards per pair (from lesson 3); braille or large-print word bank.

Steps

✎ Opening (3 min)

Retell the story together once, using the time words. Say: "Today we write it, so someone who wasn't here can read what happened."

Warm-up: a shared sentence (4 min)

Write one sentence together on the board, thinking aloud: "**First**, Duck packed seeds." Point out the capital letter at the start, the comma after the time word (optional at this stage), and the full stop at the end. Ask: "How do we know the sentence has finished?"

✎ Main activity: write it (11 min)

1. Children write the recount: at least three sentences, each starting with a time word, and a last sentence that ends the story (for example "It was a good picnic." or one of their own). They can copy words from the word bank and the time-word cards.
2. Spelling: children write untaught words the way they sound (nakpin, pikmik, wint). That is expected; do not correct spelling during writing.

3. Ways to write: by hand, typing, letter selection, or dictating to an adult who writes the exact words. A child who draws the four events and says or signs one sentence for each has also made a recount.
4. Early finishers draw a picture for the story.

Partner question and one more detail (4 min)

In pairs, one child shares the recount (reads it, signs it, or lets the partner read it). The partner asks one question, using a starter on the board: "What did ___ look like?" or "How did ___ feel?" The writer adds one detail to answer it (a word, a sentence, or a labelled part of the drawing). Then swap. Sharing with the whole class is optional.

✓ Closing check (3 min)

Each child points to (or tells the teacher) one time word, one full stop and the ending in their own recount. Collect the recounts as samples.

Vocabulary

recount, sentence, full stop, detail, ending

Differentiation

- **Support:** a writing frame with the time words already written ("First, ___. Then, ___. At the end, ___.") and the picture cards beside it.
- **Stretch:** write all four events and add a detail to each.
- **Fine-motor or writing difficulties:** dictation, typing or a frame with picture choices; the ideas and order are what is assessed, not handwriting.

⚠ Safety and care

The recount is about the made-up story, or a class event everyone shared if a child chooses it. Children are never asked to write about home, family or weekends. Partner questions are about the story only.

Lesson 5: A Fact Page, and a Private Check

Unit overview - Previous: Lesson 4

Goal

Children make a short fact page about ducks from a card the teacher reads aloud: a title that names the topic, two or three facts, and a closing line. While the class works, the teacher does a short private check with children one at a time.

Length

About 25 minutes (the one-to-one checks continue over the next few days while the class works).

Materials

- The duck fact card (below), one large copy for the board.
- Writing paper with space for a picture (one sheet per child), and pencils, or the child's usual typing or letter-selection tool.
- The check card (below), the four "Duck's Picnic" picture cards and the four time-word cards, each child's lesson 4 recount, and a record sheet with each child's name.
- Optional: braille or large-print copies of the fact card and check card.

The duck fact card (teacher reads it aloud)

Ducks

- A baby duck is called a duckling.
- Ducks that spend a lot of time in water usually have webbed feet.
- Some ducks feed by tipping up in the water, head down and tail up.
- Female mallard ducks say "quack". Most kinds of duck do not quack; they make other calls.

(Facts checked against the Wikipedia article "Duck", listed in the unit's Sources. Wording simplified for this unit.)

Steps

✎ Opening (3 min)

Say: "A recount tells what happened. A fact page tells true things about one topic. A fact page needs a title that says the topic, some facts, and an ending."

Warm-up: listen for facts (4 min)

Read the fact card aloud twice. After the second reading, ask: "Which fact surprised you?" Children answer by speaking, signing, pointing to a line, or showing a thumb on the line the teacher points to.

✎ Main activity: make a fact page (12 min)

1. Model the start on the board: a title (Ducks), one fact in the children's words, and a picture.
2. Children make their own page: the title, two or three facts from the card in their own words, and a closing line (for example "Ducks are good in the water." or "I want to see a duckling."). Invented spelling is fine. The fact card stays on the board to look back at.
3. Ways to write: by hand, typing, letter selection, dictation, or a labelled drawing with a spoken or signed fact for each label.
4. During this time, the teacher starts the private one-to-one checks (below), a few children each lesson.

Sharing (3 min)

Children who want to share read one fact to a partner. Ask the class: "How do we know these facts are true?" (They came from the card, and the card came from a source we can check.)

✓ Closing check (3 min)

Each child points to (or tells) the title, one fact and the closing line on their page.

The private one-to-one check (about 3 minutes per child)

This is not a test. It is not timed, nobody else hears it, and results are not shared with the class. Accept answers by speaking, signing, pointing, AAC or braille.

1. **Beats and vowels (outcome 1).** Say picnic: "How many beats?" Show the printed word sunset: "Point to the vowel in each part."
2. **Two-syllable words (outcome 2).** Read napkin and insect (splitting is fine).
3. **Endings (outcome 3).** Read stamps, stamping, stamped. "Which one already happened?"
4. **Order and time words (outcome 4).** Put three "Duck's Picnic" picture cards in order and touch or say a time word for each. Look together at the lesson 4 recount: is there a time word, a full stop and an ending?
5. **Fact page (outcome 5).** "Tell me one fact from your page. Where did it come from?"

Record "yes", "nearly" or "not yet" for each, with a short note. A deaf or hard of hearing child is not marked "not yet" on the beats part because of hearing; use the printed-word part and taps the child can feel.

Vocabulary

fact, topic, title, source, closing line

Differentiation

- **Support:** a frame ("Ducks ___. Ducks ___.") with picture prompts for each fact.
- **Stretch:** add a question the child still wonders about ducks, and talk with the teacher about where they could find the answer.

- **Blind or low-vision children:** braille or large-print fact card; the teacher can read it again on request.

⚠ Safety

No real animals, feathers or food are used.

Grade 2 Language and Literacy: More Vowel Teams (ay, igh, ow, oo)

Subject: English language and literacy | Grade: 2 | Lessons: 5 | Time: about 30 minutes each | Term: 1

Status: written (unreviewed) | Author: Claude Opus 5.5, AI Village

> **Unreviewed AI draft:** no educator review or classroom testing. Not an official standards alignment, a complete reading program, or a diagnostic instrument. Adapt to students and local practice.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 1. Builds on grade 1: long vowels with magic e and ee, ai, oa and two-syllable words and endings
Language and literacy progression

Big idea

Some long vowel sounds are written with a team of letters: **ay** in day, **igh** in night. Some teams can stand for more than one sound: **ow** in snow and now, **oo** in moon and took. When a word does not make sense, a good reader tries the other sound and reads the sentence again.

Outcomes

By the end of the unit, most children can:

1. Tell whether the vowel in a written one-syllable word is long or short (for example kit / kite, met / meet), and show it by saying, pointing or signing.
2. Still read words with magic e and with ee, ai and oa from grade 1, such as cape, note, seed and goat.
3. Read words with **ay** and **igh**, such as day, stay, high and night, including two-syllable words such as Sunday and midnight.
4. Read words with **ow** and **oo**, knowing that each can stand for two sounds (snow / now, moon / took), and try the other sound when the first one does not make a word that fits.
5. Read a short book again until it sounds smoother and more like talking, and fix a word that did not make sense.

Prior knowledge

The written kindergarten and grade 1 units teach the letters **s a t i p n m o d g c k e u**, magic e (a_e, i_e, o_e, u_e), the teams ee, ai and oa, the tricky words I, the, is, my, said, was, the endings -s, -ing and -ed, and two-syllable words such as sunset and picnic.

The new teams need three more letters, **y**, **h** and **w**. Lesson 1 checks or teaches these three letters before they are used. Other words children read in this unit use only the letters and patterns above.

At the start of lesson 1, check: can the child read sat, cape and seed, and the word said? If a child cannot yet blend a short word, keep working on that first.

Lessons

1. Checking long and short, and three more letters: long or short when reading; magic e and ee, ai, oa again; y, h, w.
2. ay and igh: day, stay, Sunday; high, night, midnight.
3. ow: two sounds: snow and now; try the other sound.
4. oo: two sounds: moon and took; reading sentences.
5. Reading a book again until it sounds smooth: "Duck and the Snowman", read three times, and a private one-to-one check.

Materials (whole class unless noted)

- Large-print letter cards for s, a, t, i, p, n, m, o, d, g, c, k, e, u, and three new cards for **y**, **h**, **w**.
- Large-print team cards: **ee**, **ai**, **oa** (from grade 1) and **ay**, **igh**, **ow**, **oo** (all letters of a team on one card). The **ow** and **oo** cards have two raised dots in one corner, meaning "this team can make two sounds", so the mark can be felt as well as seen.
- Two **long and short cards**: a long strip of card (about 40 cm) and a short square (about 8 cm).
- A small long and short pair (a long and a short strip of paper) for each child or pair (lesson 1).
- Four **key word cards** for sorting, snow, now (lesson 3), moon, took (lesson 4).
- Large-print word cards for each lesson (listed in each lesson).
- Mini whiteboards and pens, or paper and pencils (one per child), or the child's usual typing or letter-selection tool.
- The book "Duck and the Snowman" (text in lesson 5): one printed copy per pair, plus one large copy for the board. Copies are made by the teacher from the text; there is no publisher.
- Optional: braille or large-print copies of the word cards and the book for children who use them, made with the child's braille teacher or vision service.
- The one-to-one check card (in lesson 5), a quiet corner and a simple record sheet.

⚠ Safety and access

- Cards are large pieces of card; nothing small enough to swallow is needed.
- **Deaf and hard-of-hearing children:** long and short sounds depend on hearing. Sit the child close, face them, and use the child's usual hearing technology. The long and short cards and the raised-dot mark give visual and touchable signals. If listening is not accessible, focus on reading the print and agree with the child's specialist teacher how sound work is done.
- **Children who sign:** in a signing classroom, follow the school's approach to linking signs, fingerspelling and print.
- **Non-speaking children:** any answer can be given by pointing to a card, choosing on an AAC device, signing, or holding up the long or short card. Pointing shows a child recognises a word; it does not show blending aloud, and the record should say which was used.

- **Blind and low-vision children:** large print with strong contrast, or braille made with the child's braille teacher (braille may show some words in contracted form, so follow that teacher's advice). The two-sounds mark is raised.
- **Colour** is never the only clue on any card.
- **Fine motor:** children may say, point, or choose letter cards instead of writing.
- **Reading aloud is never forced in front of the class.** No timing of reading in public, no reading-speed charts, no rankings. Reading alone to an adult happens privately, in lesson 5.
- **Accents differ.** The vowels in snow, now, moon and took are said differently in different places, and in some accents words such as book or room may use the other oo sound. Accept the child's own way of speaking English; the point is trying the other sound when a word does not fit.

Assessment

- **Every lesson:** a short closing check (in each lesson file) for the teacher to note who might need more practice.
- **Lesson 5:** a private one-to-one check, about 4 minutes per child, covering all five outcomes: long or short in kit / kite (outcome 1); reading cape, note, seed, goat (outcome 2); reading day, stay, high, night (outcome 3); reading snow, now, moon, took, with a prompt to try the other sound if needed (outcome 4); and reading one page of the book again, with any self-correction noted (outcome 5).
- Record what each child did and what helped, with no score or pass mark. Use the record to plan who needs more practice with which team.
- A child who answered by pointing or AAC is recorded as doing so; this is a valid answer, not a lesser one.

Sources

- Common Core State Standards, Reading: Foundational Skills, Grade 2, read via the Internet Archive: https://web.archive.org/web/2025/https://www.thecorestandards.org/ELA-Literacy/RF/2/
  - RF.2.3.a: "Distinguish long and short vowels when reading regularly spelled one-syllable words."
  - RF.2.3.b: "Know spelling-sound correspondences for additional common vowel teams."
  - RF.2.3.c: "Decode regularly spelled two-syllable words with long vowels."
  - RF.2.3.e: "Identify words with inconsistent but common spelling-sound correspondences."
  - RF.2.4.b: "Read grade-level text orally with accuracy, appropriate rate, and expression on successive readings."
  - RF.2.4.c: "Use context to confirm or self-correct word recognition and understanding, rereading as necessary."
- Wikipedia, "Phonics": https://en.wikipedia.org/wiki/Phonics
  - Its list of long vowel spellings includes play (for long a), night (for long i) and bow (for long o).
  - It describes "the oo spelling of the /uː/ and /ʊ/ sounds" (as in moon and took), and lists look among short vowel examples.
  - It names "/aʊ/ as in cow" as a common diphthong (the sound of ow in now).

    - It gives igh and oo among "recognizable graphemes that allow students to construct rhyming word patterns".
- IES What Works Clearinghouse, Foundational Skills to Support Reading for Understanding in Kindergarten Through 3rd Grade (practice guide landing page only): https://ies.ed.gov/ncee/wwc/PracticeGuide/21 . A general reference for linking sounds to letters, teaching decoding, and having each child read connected text every day. It does not validate this exact unit.
- The choice of ay, igh, ow and oo, the word lists, the two-sounds mark, and the book "Duck and the Snowman" are original to this draft (CC0); the teams are the author's examples, not a list from a source.

Known gaps

- Written 10 November 2026. Text-checked by one other agent (Gemini 4 Argon, 10 November 2026, 0 errors reported plus one optional note, which was applied; see PEERCHECKS.md); not yet reviewed by a teacher. A text check is not classroom testing.
- **Letters this unit assumes.** The grade 1 year plan expected the remaining single letters to be taught in grade 1, but the written grade 1 units teach only s, a, t, i, p, n, m, o, d, g, c, k, e, u. This unit adds y, h and w in lesson 1 because the new teams need them. Common words that need other letters (play, rain, light, book, room, flow) are left out; a teacher whose class knows more letters can add them.
- Other vowel teams (ea, ie, oi, oy, ou, ew, ue and others) are not covered here.
- y at the end of a longer word (as in sunny) is not taught; Sunday is read as Sun + day.
- Sh, ch and th appear in the grade 1 year plan but not in a written grade 1 unit, so they are not used here.
- The one-to-one check is a classroom note-taking tool, not a reading test or screening.
- Little Hill characters (Goat, Duck, Hen) and the book are made up.

Lesson 1: Checking Long and Short, and Three More Letters

Unit overview - Next: Lesson 2

Goal: Children show whether the vowel in a written word is long or short, read magic e and ee, ai, oa words again, and learn (or check) the letters y, h and w.

Length: 30 minutes

Materials

- Letter cards s, a, t, i, p, n, m, o, d, g, c, k, e, u, and the new cards **y**, **h**, **w**.
- Team cards **ee**, **ai**, **oa**.
- The long and short cards, and a small long and short pair for each child or pair.
- Large word cards: sat, cape, seed, said (Opening); yes, yak, yam, hat, hen, hut, wet, wig, win (Warm-up); kit, kite, met, meet, cap, cape, cot, coat, mad, maid, hop, hope, cut, cute (Main); hope, wig, goat, yes (Closing check).
- Mini whiteboards and pens or paper and pencils (one per child), or the child's usual tool.
- Optional: braille or large-print word cards.

Steps

✎ Opening (3 min)

Read sat, cape, seed and said together. Note quietly any child who cannot yet blend sat; they will need extra blending practice alongside this unit.

Warm-up: y, h, w (6 min)

Show **y**: "This letter says /y/ as in yes." Read yes, yak, yam. Then **h** (hat, hen, hut) and **w** (wet, wig, win). If the class already knows these letters, make this a quick check and move on.

✎ Main activity (14 min)

1. **Long or short?** (6 min): show kit, then kite. Read both. "Which has the long sound, the one that says the letter's name?" Children hold up the long or short strip. Repeat with met / meet, cap / cape, cot / coat.
2. **Pairs** (5 min): in pairs, children read mad / maid, hop / hope, cut / cute, and sort each word under the long or short card.
3. **Write** (3 min): say wet, hen, hope; children write them (or choose cards) and check together.

✓ Discussion questions (with answers) (3 min)

- "What makes the a in cape long?" The e at the end (magic e).

- "How many sounds do the two letters ee make in meet?" One, the long e.
- "Is the vowel in wig long or short?" Short.

✓ Closing check (with answers) (4 min)

Show hope, wig, goat, yes. Children read each one together or by signing (non-speaking children: lay out the cards, say one word, the child points to it), then show long or short. Answers: long, short, long, short.

Vocabulary

long sound, short sound, vowel, vowel team

Differentiation

- **More support:** do the y, h, w warm-up again before lesson 2; build each long/short pair from cards so children see the one change.
- **Stretch:** read wade, wipe, hide, heed.
- **Access:** non-speaking children point or use AAC; blind children use braille or tactile cards (follow the braille teacher on contractions); children who do not write choose cards.

⚠ Safety

Large flat cards only.

Lesson 2: ay and igh

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children read words with **ay** (long a) and **igh** (long i), including two-syllable words.

Length: 30 minutes

Materials

- Team cards **ay** and **igh**, plus **ai** (from grade 1).
- Letter cards s, t, d, m, p, w, h, n, g.
- Large word cards: cape, maid (Opening); day, say, may, pay, way, hay, stay (Warm-up and Main); high, sigh, night, might, sight, tight (Main); Sunday, daytime, midnight, highway (Main); stay, night, might, Sunday (Closing check).
- Mini whiteboards and pens or paper and pencils (one per child), or the child's usual tool.
- The long and short cards.
- Optional: braille or large-print word cards.

Steps

✎ Opening (3 min)

Read cape and maid. "Both have the long a sound. Today we meet another way to write long a, and a way to write long i."

Warm-up: ay (5 min)

Show the **ay** card: "These two letters together make one sound, long a." Build d + ay → day. Read say, may, pay, way, hay, stay together. Point out that in these words ay comes at the end, and ai (as in maid) came in the middle; this is a pattern in many words, not a rule for every word.

✎ Main activity (15 min)

1. **igh** (5 min): show the **igh** card: "Three letters, one sound: long i." Build h + igh → high, then n + igh + t → night. Read sigh, might, sight, tight.
2. **Longer words** (5 min): cover half of Sunday with a hand or card: read Sun, then day, then the whole word. Do the same with daytime (day + time: magic e), midnight (mid + night) and highway (high + way).
3. **Write** (5 min): say stay, night, high; children write them (or choose cards) and check together.

✓ Discussion questions (with answers) (3 min)

- "How many letters are in the team igh? How many sounds?" Three letters, one sound.
- "Which team is in pay?" ay.

- "What two small words make midnight?" mid and night.

✓ Closing check (with answers) (4 min)

Show stay, night, might, Sunday. Children read them together or by signing (non-speaking children: lay out the cards, say one word, the child points to it). Then: "Which word has long a?" stay (and Sunday, in its second part). "Which have long i?" night, might.

Vocabulary

vowel team, long a, long i, syllable

Differentiation

- **More support:** teach ay only today and igh the next day; build each word from cards first.
- **Stretch:** read words with endings from grade 1: nights, days, stayed, staying, sighing.
- **Access:** non-speaking children point or use AAC; blind children use braille or tactile cards (follow the braille teacher on contractions); children who do not write choose cards.

⚠ Safety

Large flat cards only.

Lesson 3: ow, Two Sounds

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children read words with **ow**, know it can make the long o sound (snow) or the sound in now, and try the other sound when the first does not make a word that fits.

Length: 30 minutes

Materials

- Team card **ow** (with the raised two-sounds mark), plus **oa** (from grade 1).
- Key word cards snow and now.
- Letter cards s, n, t, m, h, c, d, g.
- Large word cards: goat, day, night (Opening); snow, tow, mow, own, stow, snowman (Main); now, how, cow, wow, down, town, gown, downtown (Main); own, how, town, snowman (Closing check).
- Large sentence cards: "The cow is in the snow." and "Now I can mow." (Main); "Goat is in the town now." (Closing check).
- Mini whiteboards and pens or paper and pencils (one per child), or the child's usual tool.
- Optional: braille or large-print word and sentence cards.

Steps

✎ Opening (3 min)

Read goat, day, night together as a quick review of oa, ay and igh.

Warm-up: one team, two sounds (5 min)

Show the **ow** card and feel or point to the two dots: "This team can make two sounds." Read the key word snow (long o, like goat) and the key word now (the sound in cow). Put the two key word cards side by side.

✎ Main activity (15 min)

1. **Long o words** (4 min): read tow, mow, own, stow, then snowman (snow + man).
2. **The other sound** (4 min): read how, cow, wow, down, town, gown, then downtown (down + town).
3. **Sort** (3 min): in pairs, mix the word cards and sort them under snow or now.
4. **Try the other sound** (4 min): read "The cow is in the snow." together. Then read "Now I can mow." The teacher reads Now with the long o sound on purpose: "Does that sound right? No, so I'll try the other sound." Read the sentence again. Children who meet a word that sounds wrong do the same: try the other sound, then reread.

✓ Discussion questions (with answers) (3 min)

- "What two sounds can ow make?" The long o in snow and the sound in now.
- "How do you know which sound to use?" Try one; if it doesn't make a word that fits the sentence, try the other and read again.
- "Which two words make snowman?" snow and man.

✓ Closing check (with answers) (4 min)

Show own, how, town, snowman. Children read each one and point to the key word with the same ow sound (non-speaking children: lay out the cards, say one word, the child points to it, then points to a key word). Answers: snow, now, now, snow. Then read "Goat is in the town now." together.

Vocabulary

vowel team, two sounds, key word, reread

Differentiation

- **More support:** do the long o words today and the now words the next day; read each sentence with an adult first.
- **Stretch:** read words with endings from grade 1: snowing, towed, owns, towns, gowns.
- **Access:** non-speaking children point or use AAC; blind children use braille or tactile cards (the two-sounds mark is raised; follow the braille teacher on contractions); children who do not write choose cards. Accept the child's own accent for both sounds.

⚠ Safety

Large flat cards only.

Lesson 4: oo, Two Sounds

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children read words with **oo**, know it can make the sound in moon or the sound in took, and read short sentences, trying the other sound when a word does not fit.

Length: 30 minutes

Materials

- Team card **oo** (with the raised two-sounds mark).
- Key word cards moon and took, plus snow and now from lesson 3 (Opening).
- Letter cards m, n, s, p, t, c, k, g, d, w, h.
- Large word cards: moon, soon, noon, spoon, hoot, mood, noontime (Main); took, cook, hook, good, wood, hood, stood, cooking, hooked (Main); soon, good, spoon, hook (Closing check).
- Large sentence cards: "The moon is high at midnight.", "Duck took a spoon.", "Hen is cooking at noon.", "Goat stood in the wood." (Main).
- Mini whiteboards and pens or paper and pencils (one per child), or the child's usual tool.
- Optional: braille or large-print word and sentence cards.

Steps

✎ Opening (3 min)

Show the key words snow and now. "What do we do if ow makes a word that doesn't fit?" Try the other sound and read again. "Today's team can make two sounds as well."

Warm-up (5 min)

Show the **oo** card and feel or point to the two dots. Read the key word moon and the key word took. Put them side by side.

✎ Main activity (15 min)

1. **The sound in moon** (4 min): read soon, noon, spoon, hoot, mood, then noontime (noon + time).
2. **The sound in took** (4 min): read cook, hook, good, wood, hood, stood, then cooking and hooked (endings from grade 1).
3. **Sentences** (7 min): read the four sentence cards together, then in pairs. If a child reads good with the sound in moon, ask: "Does that sound like a word you know? Try the other sound." Then reread the whole sentence.

✓ Discussion questions (with answers) (3 min)

- "What two sounds can oo make?" The sound in moon and the sound in took.

- "Which team is in night?" igh.
- "What did Duck take in the sentence?" A spoon.

✓ Closing check (with answers) (4 min)

Show soon, good, spoon, hook. Children read each one and point to the key word with the same oo sound (non-speaking children: lay out the cards, say one word, the child points to it, then points to a key word). Answers: moon, took, moon, took. In some accents these words are said differently; accept the child's own way of saying them.

Vocabulary

vowel team, two sounds, key word, sentence

Differentiation

- **More support:** read only the first two sentences; build moon and took from cards.
- **Stretch:** read spoons, hoots, cooks, woods, and make up a sentence with soon.
- **Access:** non-speaking children point or use AAC; blind children use braille or tactile cards (follow the braille teacher on contractions); children who do not write choose cards.

⚠ Safety

Large flat cards only. No real spoons, hooks or cooking are needed; the words are just words.

Lesson 5: Reading a Book Again Until It Sounds Smooth

Unit overview - Previous: Lesson 4

Goal: Children read a short book three times, sounding smoother and more like talking each time, and fix a word that did not make sense. The teacher holds a private one-to-one check.

Length: 30 minutes, plus about 4 minutes per child for the one-to-one check (spread over the following days if needed)

Materials

- The book "Duck and the Snowman" (text below): one printed copy per pair, plus one large copy for the board.
- Key word cards snow, now, moon, took.
- The one-to-one check card (below), a quiet corner and a simple record sheet.
- Optional: braille or large-print copies of the book and check card.

The book: "Duck and the Snowman"

Original to this draft (CC0). Every word uses letters and patterns taught in kindergarten, grade 1 and this unit, plus the tricky words I, the, is, said, was.

1. It is Sunday. It is a snow day.
2. Goat and Duck made a snowman.
3. "It needs a hat," said Goat.
4. Hen had a hat. Now the snowman had a hat.
5. At midnight, the moon was high. The wind came.
6. The wind took the hat. The hat was in the pond!
7. Hen was sad. Duck said, "I can swim."
8. Duck swam and got the hat.
9. Duck set the hat on the snowman. "Now it is on tight," said Duck. The end.

Each page can have a simple drawing made by the teacher or the class; the words carry the story without pictures.

Steps

✎ Opening (3 min)

Show the four key words. "In this book you will meet ay, igh, ow and oo. If a word doesn't fit, try the other sound."

First reading: teacher and class together (7 min)

Read the large copy together, pointing under each word. Stop at Now on page 4: "Which ow sound? Let's try both." Stop at took on page 6 in the same way.

Second reading: in pairs (8 min)

Pairs take turns reading a page each. The listener follows with a finger. If the reader gets stuck, the listener may say "Try the other sound" or "Read it again", but not the word itself.

Third reading: like talking (7 min)

Read together again, this time with expression: Goat sounds sure on page 3, the hat going in the pond on page 6 sounds surprised, Duck sounds pleased on page 9. "Did it sound smoother this time?"

✓ Discussion questions (with answers) (3 min)

- "What took the hat?" The wind.
- "Who got the hat back, and how?" Duck; Duck swam in the pond.
- "Find a word with igh." midnight, high or tight.

Closing (2 min)

"Reading a book again makes it sound smoother. That's what good readers do." No one is timed or compared.

One-to-one check (private, about 4 minutes per child)

In a quiet corner, with the check card. The child may answer by reading aloud, signing, pointing or AAC; record which.

1. **Long or short** (outcome 1): show kit and kite. "Which has the long sound?" (kite.)
2. **Grade 1 patterns** (outcome 2): read cape, note, seed, goat.
3. **ay and igh** (outcome 3): read day, stay, high, night.
4. **ow and oo** (outcome 4): read snow, now, moon, took. If a word is read with the other sound, ask: "Does that sound like a word you know? Try the other sound." Note whether the child changes it.
5. **Rereading** (outcome 5): the child chooses a page of the book and reads it; note any word the child fixed without help.

Record what the child did and what helped, with no score or pass mark.

Vocabulary

reread, smooth, expression

Differentiation

- **More support:** the child reads alongside an adult (echo reading: the adult reads a line, the child reads it after) for the second reading.
- **Stretch:** the child writes one more page for the book (for example what Goat says), using any spelling; invented spelling is fine.
- **Access:** non-speaking children can follow along and point to words, or join the reading on an AAC device with prepared pages; blind children use a braille copy made with their braille teacher; deaf children who sign can sign the story.

⚠ Safety

No real snow, water or ponds are needed; it is a story. Reading aloud is never forced in front of the class.

Grade 2 Language and Literacy: Longer Words, un- and re-, and Joining Sentences

Subject: English language and literacy | Grade: 2 | Lessons: 5 | Time: about 30 minutes each | Term: 2

Status: written (unreviewed) | Author: Claude Opus 5.5, AI Village

> **Unreviewed AI draft:** no educator review or classroom testing. Not an official standards alignment, a complete reading program, or a diagnostic instrument. Adapt to students and local practice.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 2. Builds on grade 1 and grade 2 term 1: two-syllable words and endings and more vowel teams
Language and literacy progression

Big idea

A long word is often two short parts joined together: rain + bow is rainbow. A small part at the front can change what a word means: un- can mean "not" or "the opposite", and re- can mean "again". Some words change in an odd way (one foot, two feet; today I sit, yesterday I sat). Two short sentences can be joined with and or but.

Outcomes

By the end of the unit, most children can:

1. Read short words with four more letters, **r**, **l**, **f** and **b**, such as red, leg, fan, bed, rain and light.
2. Read two-syllable words with a long vowel by reading one part, then the other, then the whole word (rainbow, sailboat, sunrise, weekend).
3. Read words that start with **un-** and **re-** (unlock, unpack, refill, retell) and say what the new word means.
4. Say the odd plural or past form of some common words: feet, men, geese, children, mice; sat, hid, told, ran, got.
5. Join two short sentences with and or but, and read a short book again until it sounds smoother.

Prior knowledge

The written units before this one teach the letters **s a t i p n m o d g c k e u**, then **y**, **h** and **w** (grade 2 term 1); magic e; the teams **ee**, **ai**, **oa**, **ay**, **igh**, **ow** and **oo**; the tricky words I, the, is, my, said, was; the endings -s, -ing and -ed; and two-syllable words such as sunset and midnight.

This unit adds four letters, **r**, **l**, **f** and **b**, in lesson 1, and one tricky word, to, in lesson 5. Every word children are asked to read uses only these letters and patterns, with three exceptions that are taught as words to learn and pointed out by the teacher: told (lesson 4), children (lesson 4)

and the apostrophe in Duck's (lesson 5). Words such as mice, teeth and fish are said and heard, not read.

At the start of lesson 1, check: can the child read day, night and moon? If not, go back to the term 1 unit first.

Lessons

1. Four more letters: r, l, f, b: short words, then long-vowel words such as rain, ride, feet, light.
2. Long words in two parts: rainbow, sailboat, sunrise, weekend.
3. un- and re-: unlock, unpack, refill, retell, and what they mean.
4. One foot, two feet; today and yesterday: odd plurals and odd past forms.
5. Joining sentences, and a book read three times: and and but; "The Kite in the Tree"; a private one-to-one check.

Materials (whole class unless noted)

- Large-print letter cards for **r**, **l**, **f**, **b** (new) and the letters and team cards from the term 1 unit.
- Large-print word cards for each lesson (listed in each lesson).
- A **two-part strip**: a long card with a fold line in the middle, so a word card can be folded to show one part at a time (lesson 2).
- Two **front cards**: **un-** and **re-**, each with a raised line along the right-hand edge, so the "front part" can be felt as well as seen (lesson 3).
- Picture pairs drawn by the teacher (lesson 4): one foot / two feet, one man / two men, one goose / two geese, one child / three children, one mouse / two mice. Stick drawings are fine.
- A small box or bag to pack and unpack, and an empty cup (lesson 3).
- Sentence strips and two **joining cards**, and and but (lesson 5).
- Mini whiteboards and pens, or paper and pencils (one per child), or the child's usual typing or letter-selection tool.
- The book "The Kite in the Tree" (text in lesson 5): one printed copy per pair, plus one large copy for the board. Copies are made by the teacher from the text; there is no publisher.
- Optional: braille or large-print copies of the word cards and the book, made with the child's braille teacher or vision service.
- The one-to-one check card (in lesson 5), a quiet corner and a simple record sheet.

⚠ Safety and access

- Cards and strips are large; nothing small enough to swallow is needed.
- **Deaf and hard-of-hearing children:** sit the child close, face them, and use the child's usual hearing technology. The fold strip and the raised edge on the front cards give visual and touchable signals. Agree with the child's specialist teacher how sound work is done.
- **Children who sign:** in a signing classroom, follow the school's approach to linking signs, fingerspelling and print. Odd plurals and past forms may be shown differently in a sign language; accept the child's way.
- **Non-speaking children:** any answer can be given by pointing to a card, choosing on an AAC device, or signing. Pointing shows a child recognises a word; it does not show blending aloud, and the record should say which was used.

- **Blind and low-vision children:** large print with strong contrast, or braille made with the child's braille teacher (follow that teacher's advice on contractions). Picture pairs can be replaced with small real objects to count, or simply said.
- **Colour** is never the only clue on any card.
- **Fine motor:** children may say, point, or choose letter cards instead of writing.
- **Reading aloud is never forced in front of the class.** No timing of reading in public, no reading-speed charts, no rankings.
- **Dialects differ.** Some children say I sat, some may say I sit down yesterday or another form from home or another language. Accept the child's own speech; the lesson adds the school form alongside, it does not correct home speech.

Assessment

- **Every lesson:** a short closing check (in each lesson file) for the teacher to note who might need more practice.
- **Lesson 5:** a private one-to-one check, about 4 minutes per child, spread over the week, covering all five outcomes: reading red, lip, fan, bed, rain, light (outcome 1); reading rainbow, sunrise, weekend in parts (outcome 2); reading unlock and refill and saying what they mean (outcome 3); finishing four spoken sentences with feet, men, sat and told (outcome 4); joining two sentence cards with and, and reading one page of the book again (outcome 5).
- Record what each child did and what helped, with no score or pass mark.
- A child who answered by pointing or AAC is recorded as doing so; this is a valid answer, not a lesser one.

Sources

- Common Core State Standards, Reading: Foundational Skills, Grade 2, read via the Internet Archive: https://web.archive.org/web/2025/https://www.thecorestandards.org/ELA-Literacy/RF/2/
  - RF.2.3.c: "Decode regularly spelled two-syllable words with long vowels."
  - RF.2.3.d: "Decode words with common prefixes and suffixes."
  - RF.2.4.b: "Read grade-level text orally with accuracy, appropriate rate, and expression on successive readings."
- Common Core State Standards, Language, Grade 2, read via the Internet Archive: https://web.archive.org/web/2024/https://www.thecorestandards.org/ELA-Literacy/L/2/
  - L.2.1.b: "Form and use frequently occurring irregular plural nouns (e.g., feet, children, teeth, mice, fish)."
  - L.2.1.d: "Form and use the past tense of frequently occurring irregular verbs (e.g., sat, hid, told)."
  - L.2.1.f: "Produce, expand, and rearrange complete simple and compound sentences".
  - L.2.4.b: "Determine the meaning of the new word formed when a known prefix is added to a known word (e.g., happy/unhappy, tell/retell)."
- IES What Works Clearinghouse, Foundational Skills to Support Reading for Understanding in Kindergarten Through 3rd Grade (practice guide landing page only): https://ies.ed.gov/ncee/wwc/PracticeGuide/21 . A general reference for teaching decoding and having each child read connected text every day. It does not validate this exact unit.
- The word lists, the order of the letters, the picture pairs, the joining cards and the book "The Kite in the Tree" are original to this draft (CC0); they are the author's examples, not lists from a source.

Known gaps

- Written 10 November 2026. One other agent (Gemini 4 Argon, at d11f227) text-checked this unit on 2026-11-10 and reported no errors. That is a text check by an AI agent, not a teacher review or classroom test.
- **Letters this unit assumes.** The written units teach only some single letters. This unit adds r, l, f and b because the planned words need them. Other letters (j, q, v, x, z) and the pairs sh, ch, th, wh and ng are still not taught in a written unit, so fish, teeth, children and mice are mostly heard, not read.
- **Suffixes.** RF.2.3.d names prefixes and suffixes. This unit teaches only the prefixes un- and re-; suffixes beyond grade 1's -s, -ing and -ed (such as -ful, -less, -ly) are left for later.
- Vowels followed by r (as in car, bird, her), y at the end of a longer word (happy, so the standard's unhappy example is not read), and other vowel teams are not taught.
- told has a long o without a team or magic e; it is taught as a word to learn. Not every word that starts with un is a prefix (until); lesson 3 shows one example.
- L.2.1.f also asks children to expand and rearrange sentences; this unit only joins two sentences. The comma before and or but in the examples is the author's choice; some schools leave it out in short sentences.
- Collective nouns (L.2.1.a) and reflexive pronouns (L.2.1.c) are not covered here.
- The one-to-one check is a classroom note-taking tool, not a reading test or screening.
- Little Hill characters (Goat, Duck) and the book are made up. Goat and a kite also appear in a grade 1 book; the callback is deliberate.

Lesson 1: Four more letters: r, l, f, b

Unit overview - Next: Lesson 2

Goal: Children read short words with the new letters **r**, **l**, **f** and **b**, then long-vowel words that use them.

Length: 30 minutes

Materials

- Letter cards **r**, **l**, **f**, **b** (new), plus a, e, i, o, u, d, g, n, p, t, s, k.
- Team cards **ai**, **ee**, **oa**, **igh**.
- Large word cards: day, night, moon (Opening); red, rat, run, leg, lip, log, fan, fun, fig, bed, bus, bag (Warm-up and Main); rain, ride, feet, boat, like, light (Main); red, leg, fan, bed, rain, light (Closing check).
- Mini whiteboards and pens or paper and pencils (one per child), or the child's usual tool.
- Optional: braille or large-print word cards.

Steps

✎ Opening (3 min)

Read day, night and moon together. "You know lots of letters and teams. Today we learn four more letters, so we can read many more words."

Warm-up: the four letters (5 min)

Show each card and say its sound: **r** as in red, **l** as in leg, **f** as in fan, **b** as in bed. Children say the sound back (or sign, or point to the card when the teacher says the sound). Point out that **b** and **d** look alike; hold them side by side and trace them in the air.

✎ Main activity (15 min)

1. **Short words** (6 min): build and read red, rat, run; leg, lip, log; fan, fun, fig; bed, bus, bag.
2. **Long vowels with the new letters** (5 min): build r + ai + n → rain; r + i_e + d → ride; f + ee + t → feet; b + oa + t → boat; l + i_e + k → like; l + igh + t → light.
3. **Write** (4 min): say red, bag, rain; children write them (or choose cards) and check together.

✓ Discussion questions (with answers) (3 min)

- "Which new letter looks a bit like d?" b.
- "Which team is in boat?" oa.
- "Is the vowel in rat long or short?" Short.

✓ Closing check (with answers) (4 min)

Show red, leg, fan, bed, rain, light. Children read them together or by signing (non-speaking children: lay out the cards, say one word, the child points to it). "Which word has the team igh?" light.

Vocabulary

letter, sound, vowel team, long vowel, short vowel

Differentiation

- **More support:** teach r and l today and f and b the next day; build each word from cards first.
- **Stretch:** read words with grade 1 endings: rains, riding, liked, boats.
- **Access:** non-speaking children point or use AAC; blind children use braille or tactile cards; children who do not write choose cards.

⚠ Safety

Large flat cards only.

Lesson 2: Long words in two parts

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children read two-syllable words with long vowels by reading one part, then the other, then the whole word.

Length: 30 minutes

Materials

- The two-part strip (a long card with a fold line in the middle).
- Large word cards: sunset, midnight (Opening); rainbow, sailboat, raincoat, sunlight, highway (Warm-up and Main); pancake, sunrise, inside, weekend (Main); rainbow, sailboat, sunrise, weekend (Closing check).
- Mini whiteboards and pens or paper and pencils (one per child), or the child's usual tool.
- Optional: braille or large-print word cards.

Steps

✎ Opening (3 min)

Read sunset and midnight together. "These are long words made of two short parts. Today the parts have long vowels in them."

Warm-up: fold and read (5 min)

Put rainbow on the two-part strip and fold it so only rain shows. Read rain. Unfold: bow (ow as in snow). Then the whole word: rainbow. Do the same with sailboat and raincoat.

✎ Main activity (15 min)

1. **Two teams** (5 min): read sunlight (sun + light) and highway (high + way). Ask: "Which part has the long vowel?" In sunlight the second part; in highway both.
2. **Magic e in a part** (5 min): read pancake (pan + cake), sunrise (sun + rise), inside (in + side) and weekend (week + end). Show that the magic e only reaches back inside its own part.
3. **Write** (5 min): say rainbow and sunrise. Children write the first part, then the second (or choose cards), and check together.

✓ Discussion questions (with answers) (3 min)

- "What are the two parts of sailboat?" sail and boat.
- "Where is the long e in weekend?" In the first part, week.
- "Why does folding the word help?" A short part is easier to read than a long word all at once.

✓ Closing check (with answers) (4 min)

Show rainbow, sailboat, sunrise, weekend. Children read each one part by part, then whole (non-speaking children: the teacher says one word and the child points to it). "Which word has a magic e?" sunrise.

Vocabulary

syllable, part, long vowel, magic e

Differentiation

- **More support:** keep the fold strip for every word; read only words with one long part.
- **Stretch:** read rainbows, sailboats, weekends; try daylight and moonlight.
- **Access:** blind children feel the fold line on a braille or tactile card; non-speaking children point or use AAC.

⚠ Safety

Large flat cards only.

Lesson 3: un- and re-

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children read words that start with **un-** and **re-** and say what the new word means.

Length: 30 minutes

Materials

- The front cards **un-** and **re-** (raised line along the right-hand edge).
- Large word cards: lock, pack, load, pin, hook, fill, tell, paint, play, make (Opening and Main); until (Main); unlock, refill, unpack, retell (Closing check).
- A small box with a lid, or a bag that can be packed and unpacked (Warm-up).
- An empty cup (Warm-up; filling is mimed).
- Mini whiteboards and pens or paper and pencils (one per child), or the child's usual tool.
- Optional: braille or large-print word cards.

Steps

✎ Opening (3 min)

Read lock, pack and fill. "Today we put a small part at the front of a word, and it changes what the word means."

Warm-up: pack and unpack (5 min)

Put two cards into the box: "I pack the box." Take them out: "Now I unpack it." Put the **un-** card in front of pack: unpack. "Un- can mean the opposite." Fill a cup with pretend water (an empty cup and a mime): "I fill it. I drink. I refill it: I fill it again." Put **re-** in front of fill: refill. "Re- can mean again."

✎ Main activity (15 min)

1. **un-** (5 min): read unlock, unpack, unload, unpin, unhook. For each, a child says, mimes or signs what it means ("the opposite of lock").
2. **re-** (5 min): read refill, retell, repaint, replay, remake. For each: "do it again".
3. **Careful** (2 min): show until. "This starts with u, n, but til is not a word we know, and until does not mean 'not til'. Not every un at the front is a prefix."
4. **Write** (3 min): say unlock and replay; children write them (or choose cards).

✓ Discussion questions (with answers) (3 min)

- "What does retell mean?" To tell again.
- "What does unpack mean?" The opposite of pack: take things out.
- "Is the un in until a front part that means 'not'?" No.

✓ Closing check (with answers) (4 min)

Show unlock, refill, unpack, retell. Children read each word, then say, mime or point to show its meaning (for example, the teacher offers two picture or word choices, "fill again" or "not fill", and the child points).

Vocabulary

prefix, front part, opposite, again

Differentiation

- **More support:** do un- today and re- tomorrow; keep the real box for every un- word.
- **Stretch:** make new words with un- or re- from known words (unpaint is not a word: talk about why some words do not take a prefix).
- **Access:** blind children feel the raised edge on the front card; non-speaking children answer by choosing between two meanings.

⚠ Safety

Large flat cards and an empty cup only; no real water is needed.

Lesson 4: One foot, two feet; today and yesterday

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children say, and read where the letters are known, odd plural and past forms of some common words.

Length: 30 minutes

Materials

- Picture pairs (stick drawings are fine): one foot / two feet, one man / two men, one goose / two geese, one child / three children, one mouse / two mice.
- Large word cards: cats, pigs (Opening); foot, feet, man, men, goose, geese, children (Warm-up and Main); sit, sat, hide, hid, tell, told, run, ran, get, got (Main).
- Mini whiteboards and pens or paper and pencils (one per child), or the child's usual tool.
- Optional: braille or large-print word cards; small real objects to count instead of pictures.

Steps

✎ Opening (3 min)

Read cats and pigs. "Most words add s when there is more than one. Today we meet some words that change in an odd way instead."

Warm-up: one and more (5 min)

Show one foot and two feet. "One foot, two..." Children finish: feet. Show the word cards foot and feet and read them (oo, then ee). Do the same with man / men and goose / geese. Then show one child and three children and say the words; show the card children as a word to learn whole: "This word has letters we have not learned yet, so we learn it as a whole word."

✎ Main activity (15 min)

1. **Heard, not read** (3 min): show one mouse and two mice. Say "one mouse, two mice" together. These words are only said today.
2. **Today and yesterday** (8 min): "Today I sit. Yesterday I..." sat. Read the pairs sit / sat, hide / hid, tell / told, run / ran, get / got. Point out that told has a long o with no team and no magic e: "We learn this one as a word."
3. **Say a sentence** (4 min): in pairs, one child says a "today" sentence (for example, "Today I run"), the partner says it for yesterday ("Yesterday I ran"). Children may sign or point to the card.

✓ Discussion questions (with answers) (3 min)

- "Why is feet odd?" It does not add s; the vowel changes.
- "What is yesterday for hide?" hid.
- "Do we say mouses?" No, we say mice (but it is fine that the word sounds like it should be mouses).

✓ Closing check (with answers) (4 min)

Say each sentence and let children finish it aloud, by signing, or by pointing to one of two word cards: "One man, two..." men. "One goose, two..." geese. "Today I sit; yesterday I..." sat. "Today I tell; yesterday I..." told.

Vocabulary

plural, more than one, past, yesterday

Differentiation

- **More support:** do plurals today and past forms tomorrow; keep pictures for every word.
- **Stretch:** read the sentences I see geese. and Goat hid.
- **Access:** children who sign may show plurals and past forms in their sign language's own way; blind children count real objects; children who do not speak choose between two cards.

⚠ Safety

Large flat cards only. If real objects are used for counting, use objects too large to swallow.

Lesson 5: Joining sentences, and a book read three times

Unit overview - Previous: Lesson 4

Goal: Children join two short sentences with and or but, and read a short book again until it sounds smoother.

Length: 30 minutes, plus the one-to-one check spread over the week

Materials

- Sentence strips: Duck had a kite. / Goat had a kite.; Goat ran up the hill. / Duck ran up the hill.; The kite had a rip. / Goat did not get sad.
- Two joining cards: and, but.
- A word card for the new tricky word to.
- The book "The Kite in the Tree" (below): one printed copy per pair, plus one large copy for the board.
- Optional: braille or large-print copies of the book.
- The one-to-one check card (below), a quiet corner and a record sheet.

Steps

✎ Opening (3 min)

Show the word card to: "This is a tricky word. We say it 'too'. We learn it as a whole word." Read it together.

Warm-up: joining two sentences (5 min)

Lay down Duck had a kite. and Goat had a kite. "Two sentences. We can join them." Put and between them and read: Duck had a kite, and Goat had a kite. Do the same with the hill strips. Then The kite had a rip. and Goat did not get sad.: "This one is a surprise, so we use but." Read: The kite had a rip, but Goat did not get sad. Show that the first full stop goes and the second word loses its capital letter.

✎ Main activity (14 min)

1. **First read** (4 min): the teacher reads the book aloud from the large copy, pointing to each word.
2. **Second read** (5 min): pairs read it together, one page each, helping each other with hard words. On page 7, stop and find unhooked: "What does un- mean here?" Opposite of hooked. On page 4, point out Duck's: the small mark means the kite belongs to Duck.
3. **Third read** (5 min): pairs read it again, trying to make it sound like talking. Find the two sentences joined with but (pages 8 and 9).

✓ Discussion questions (with answers) (3 min)

- "Why did Duck say 'My kite!'?" It was stuck in the tree.
- "How did Goat get the kite?" Goat held up a big stick and unhooked it.
- "Which joining word shows a surprise?" but.

✓ Closing check (with answers) (5 min)

Show two strips, Goat sat. and Duck sat. Children choose the joining card (and) and read the joined sentence, or point to the card when the teacher reads the choices. Then each pair reads one page again to each other; the teacher listens to a few pairs and notes self-corrections.

The book: "The Kite in the Tree"

(CC0, original to this draft. One sentence or pair of sentences per page.)

1. Goat had a red kite. Duck had a kite too.
2. "It is a fine day," said Goat. "The wind is good."
3. Goat and Duck ran up the hill, and the kites went up high.
4. A big gust came. Duck's kite went into a tree.
5. "My kite!" said Duck. "It is stuck."
6. Goat did not run off. Goat got a big stick.
7. Goat held up the stick and unhooked the kite.
8. The kite had a rip, but Goat and Duck stuck tape on it.
9. Duck's kite went back up. The sun was low, but the kites stayed up high.

Words to point out before reading: to in into (page 4), Duck's (pages 4 and 9), said and was (tricky words from grade 1).

One-to-one check (about 4 minutes per child, spread over the week)

In a quiet corner, one child at a time. Answers may be spoken, signed, pointed to, or given on AAC.

1. Read red, lip, fan, bed, rain, light. (Outcome 1)
2. Read rainbow, sunrise, weekend, part by part if needed. (Outcome 2)
3. Read unlock and refill. "What does it mean?" (opposite of lock; fill again). A child may choose between two spoken meanings. (Outcome 3)
4. Finish: "One foot, two..." (feet); "One man, two..." (men); "Today I sit, yesterday I..." (sat); "Today I tell, yesterday I..." (told). (Outcome 4)
5. Lay out Goat ran. and Duck ran. "Join them with a joining card." (and). Then read one page of the book again; note any word the child fixed. (Outcome 5)

Record what the child did and what helped, with no score.

Vocabulary

join, joining word, and, but, sentence, reread

Differentiation

- **More support:** use only and today; the teacher reads the book first and the child joins in on repeated words.
- **Stretch:** children write their own two sentences about Goat or Duck and join them with and or but.
- **Access:** non-speaking children join strips by placing the card; blind children use a braille copy; no child reads aloud in front of the class.

⚠ Safety

Large flat cards and paper only.

Grade 2 Language and Literacy: Writing for a Reason: a Seed Report and a Letter to Mayor Hen

Subject: English language and literacy | Grade: 2 | Lessons: 5 | Time: about 30 minutes each | Term: 3

Status: written (unreviewed) | Author: Claude Opus 5.5, AI Village

> **Unreviewed AI draft:** no educator review or classroom testing. Not an official standards alignment, a complete writing program, or a diagnostic instrument. Adapt to students and local practice. Check any plan to send letters outside the classroom against your school's rules.
>
> Text-checked by three other agents (Gemini 3.8 Flash, Gemini 4 Argon and Gemini 4 Carbon); see Known gaps.

Back to the grade 2 year plan - Term 3. Builds on grade 1 and grade 2 term 2: two-syllable words, endings, a recount and a fact page and longer words, un- and re-, and joining sentences
Language and literacy progression

Big idea

We write for a reason. A **report** tells facts about one topic: it says what the topic is, gives facts, and ends. An **opinion** says what I think and gives a reason, often with because. A **letter** starts with a greeting and ends with a closing, each with a comma. Writers make their writing better by reading it to a partner and changing something.

Outcomes

By the end of the unit, most children can:

1. Say or show at least two facts about seeds that the class found in two fact pages (shared research).
2. Help write a short class report with a first sentence that names the topic, two or more facts, and an ending sentence; and write one fact sentence of their own.
3. Say or write an opinion with a reason joined by because, and add a second reason with also or and.
4. Set out a short letter with a greeting and a closing, each followed by a comma (Dear Mayor Hen, / From,).
5. Listen to a partner's comment on their letter and change or add one thing.

Prior knowledge

The written units before this one teach the letters **s a t i p n m o d g c k e u y h w r l f b**; magic e; the teams **ee**, **ai**, **oa**, **ay**, **igh**, **ow** (as in low) and **oo** (as in moon); the tricky words I, the, is, my, said, was and to; the endings -s, -ing and -ed; and joining two sentences with and or but.

Every word card and sentence strip children are asked to read uses only these letters and patterns, with four exceptions taught as words to learn and pointed out by the teacher: soil (lesson 1), because and also (lesson 3) and Dear (lesson 4). Mayor is read as a name on a card, and the teacher points out From (lesson 4), because in many accents its o does not make the usual short o sound. The two fact pages and Mayor Hen's letter are read **aloud by the teacher**; children are not asked to read them. In their own writing, children may spell words the way they sound; that is expected at this stage and is not marked wrong.

At the start of lesson 1, check: can the child read seed, rain and grow? If not, go back to the term 1 unit first.

Lessons

1. Finding facts in two fact pages: shared research about seeds; a class fact chart.
2. Writing a class report: first sentence, facts, ending sentence; each child writes one fact.
3. I think... because...: Mayor Hen asks what the park needs; opinions and reasons.
4. Writing a letter: greeting and closing with commas; each child writes a letter to Mayor Hen.
5. Partner talk and making it better: one kind comment, one question, one change; a private one-to-one check.

Materials (whole class unless noted)

- The two fact pages, "What a Seed Needs" and "How Seeds Get About" (text in lesson 1), one large copy each for the board. Optional: two or three library books about seeds, for the teacher to read from.
- Large-print word cards for each lesson (listed in each lesson), including the four new words to learn: soil, because, also, Dear.
- A large sheet for the class fact chart, with two columns, **What a seed needs** and **How seeds get about** (lesson 1).
- Sentence strips for the class report (lesson 2) and for the opinion and letter models (lessons 3 and 4).
- Three picture cards drawn by the teacher: **a pond**, **a tree**, **a sandpit** (lesson 3). Stick drawings are fine.
- Mayor Hen's letter (text in lesson 3), one large copy.
- A large **comma card**: a big comma with a raised outline, so it can be felt as well as seen (lesson 4).
- A **letter frame** sheet, one per child (lesson 4): a line for the greeting, three lines for the body, a line for the closing and a line for a name.
- A box with a slot labelled "Mayor Hen's post box" (lessons 4 and 5).
- Three large **talk cards** with a symbol each: **One kind thing** (a heart), **One question** (a question mark), **One change** (a pencil) (lesson 5).
- A **cut-up letter** in four large word pieces plus two large card commas, for the one-to-one check (lesson 5).
- Mini whiteboards and pens, or paper and pencils (one per child), or the child's usual typing or letter-selection tool.
- Optional: braille or large-print copies of the fact pages, word cards and letter frame, made with the child's braille teacher or vision service.
- The one-to-one check card (in lesson 5), a quiet corner and a simple record sheet.

⚠ Safety and access

- **No real seeds are handled** in this unit; seeds appear only in pictures and words. (If a teacher adds real seeds, check allergies first, use large seeds, never let children put them in their mouths, and wash hands after.)
- Cards, strips and the post box are large; nothing small enough to swallow is needed.
- **Privacy:** letters are signed with the child's first name only, or a made-up name if the child prefers. Letters go in the classroom post box to the made-up Mayor Hen. No home details, addresses or photos go in any letter.
- **Deaf and hard-of-hearing children:** sit the child close, face them, and use the child's usual hearing technology. The fact pages are shown on the board while read. Agree with the child's specialist teacher how sound work is done.
- **Children who sign:** opinions and reasons may be signed; in a signing classroom, follow the school's approach to linking signs and print.
- **Non-speaking children:** any answer can be given by pointing to a card, choosing on an AAC device, or signing. A child may build sentences from word cards instead of writing. The record should say which was used.
- **Blind and low-vision children:** large print with strong contrast, or braille made with the child's braille teacher. The raised comma card and a tactile letter frame (raised lines) help with layout. Picture cards can be described aloud.
- **Colour** is never the only clue on any card or chart.
- **Fine motor:** children may say, point, type, or place word cards instead of writing by hand; an adult may scribe the child's own words.
- **Partner talk is kind and opt-in to share.** No child is made to read their writing to the whole class. Comments are about the writing, not the writer.
- **Dialects and home languages differ.** Accept the child's own way of saying an opinion; the lesson adds the school form alongside.

Assessment

- **Every lesson:** a short closing check (in each lesson file) for the teacher to note who might need more practice.
- **Lesson 5:** a private one-to-one check, about 4 minutes per child, spread over the week, covering all five outcomes: saying two seed facts from the chart (outcome 1); pointing to the first sentence, a fact and the ending of the class report, and saying one fact sentence (outcome 2); giving an opinion about the park with because and a second reason (outcome 3); placing the two commas in a cut-up letter (outcome 4); saying what they changed after partner talk (outcome 5).
- Record what each child did and what helped, with no score or pass mark.
- A child who answered by pointing, AAC or with a scribe is recorded as doing so; this is a valid answer, not a lesser one.

Sources

Standards are quoted exactly; the unit is not a full alignment.

- Common Core State Standards, Writing, Grade 2, read via the Internet Archive: https://web.archive.org/web/2025/https://www.thecorestandards.org/ELA-Literacy/W/2/
  - W.2.1: "Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because , and , also) to connect opinion and reasons, and provide a concluding statement or section."
  - W.2.2: "Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section."
  - W.2.5: "With guidance and support from adults and peers, focus on a topic and strengthen writing as needed by revising and editing."
  - W.2.7: "Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations)."
- Common Core State Standards, Language, Grade 2, read via the Internet Archive: https://web.archive.org/web/2024/https://www.thecorestandards.org/ELA-Literacy/L/2/
  - L.2.2.b: "Use commas in greetings and closings of letters."
- Seed facts were checked against Wikipedia, "Germination" (https://en.wikipedia.org/wiki/Germination), which says the most important external factors "include right temperature, water, oxygen or air and sometimes light or darkness" and that the first part to emerge from the seed is "the embryonic root"; and "Seed dispersal" (https://en.wikipedia.org/wiki/Seed_dispersal), which says dispersal "may be achieved through the use of gravity, water, wind, or animals", gives dandelions as a classic wind example, and describes seeds carried on animals with "hooks, spines and barbs". The fact pages simplify these for seven-year-olds.
- The fact pages, word lists, Mayor Hen's letter, the model report and the model letter are original to this draft (CC0); they are the author's examples, not texts from a source.

Known gaps and cautions

- Written 11 November 2026. Two other agents (Gemini 3.8 Flash and Gemini 4 Argon, both at 504c293) text-checked this unit on 2026-11-11. Gemini 3.8 Flash reported no errors; Gemini 4 Argon reported one: also was read by children but not taught as a word to learn, fixed in 1971ca4 (with a note on From). Gemini 4 Carbon (at fdc08ff, including that fix) checked the sources, phonics and timings and reported one miscount of cut-up letter pieces, since fixed. Those are text checks by AI agents, not a teacher review or classroom test.
- **Shared research is small here.** W.2.7's example is reading "a number of books on a single topic". This unit uses two short teacher-read fact pages, plus optional library books. A class with good library books on seeds should use them.
- **Words this unit adds.** soil (oi), because (au, and a final e that is not magic e), also (al as in "all", and a final o that says its name) and Dear (ear) use patterns not yet taught; they are taught as words to learn. Vowels followed by r, the pairs sh, ch, th, wh and ng, and the letters j, q, v, x, z are still not taught in a written unit, so many words children want to write (bird, fish, think, swing) will be spelled by sound. That is expected.
- Mayor is read as part of a name card (Mayor Hen), not sounded out. The report labels (lesson 2) and the talk cards (lesson 5) are read by the teacher; the talk cards also carry symbols. Mayor Hen's letter and the fact pages are read aloud by the teacher.

- **Seed facts are simplified.** "A seed needs to get wet" leaves out warmth and air, which the fact page mentions but children are not asked to write. Some seeds need light or darkness to sprout; the unit does not claim that all seeds need sun.
- **Opinions are about made-up choices** (what Little Hill park should get), not about children's homes, families or real local politics.
- Editing for spelling and capital letters (W.2.5 says "revising and editing") is touched on only through the commas; this unit puts revising first.
- Other L.2.2 parts (capitals for holidays and places, apostrophes, spelling patterns) are not covered here.
- The one-to-one check is a classroom note-taking tool, not a writing test or screening.
- Little Hill, Mayor Hen, Duck and Goat are made up.

Lesson 1: Finding facts in two fact pages

Unit overview - Next: Lesson 2

Goal: Children listen to two fact pages about seeds, find facts in them, and help sort the facts onto a class chart (shared research).

Length: 30 minutes

Materials

- The two fact pages (below), one large copy each for the board. Optional: one or two library books about seeds.
- The class fact chart: a large sheet with two columns, **What a seed needs** and **How seeds get about**.
- Large-print fact cards to stick on the chart: A seed needs to get wet. / A root grows in the soil. / Wind can lift a seed. / A seed can stick to a dog. / A seed can float in a pond.
- A word card for the new word to learn: soil.
- Mini whiteboards and pens, or paper and pencils (one per child), or the child's usual typing or letter-selection tool.
- Optional: braille or large-print copies of the fact pages and fact cards.

Steps

✎ Opening (4 min)

"This week we are writers. Writers write for a reason. This week we will write a report, which tells facts, and a letter, which tells what we think." Ask: "What is a fact?" (Something true that we can check.) "Today we are researchers: we find facts in more than one place."

Show the word card soil: "This is a word to learn. We say it 'soil'. It is the earth that plants grow in." Read it together.

✎ Main activity (16 min)

1. **Fact page 1** (5 min): the teacher reads "What a Seed Needs" aloud from the board, pointing to each line. Children show a thumb when they hear a fact. Stop after each part and ask, "What fact did we find?"
2. **Fact page 2** (5 min): the same with "How Seeds Get About".
3. **Sort the facts** (6 min): hold up each fact card. Children read it together (all words are taught except soil), then decide which column it goes in. A child places the card on the chart, or points while the teacher places it. Ask: "Which fact page told us that?"

✓ Discussion questions (with answers) (5 min)

- "What comes out of a seed first?" A tiny root.

- "Name one way a seed can get about." Wind, sticking to an animal's fur, floating on water, or falling and rolling.
- "Why do we look in two fact pages, not one?" Each one tells us different facts, and we can check that facts agree.

✓ Closing check (with answers) (5 min)

On whiteboards, each child draws or writes one fact from the chart (for example a seed on the wind, or A seed needs to get wet.). Then the teacher says three sentences; children show thumbs up for a fact from our pages and thumbs down if it is not:

- "A seed can float in a pond." (Up.)
- "A seed needs to get wet." (Up.)
- "Seeds grow best in the freezer." (Down: seeds need the right warmth; the fact page says not too cold.)

The fact pages (read aloud by the teacher)

(CC0, original to this draft. Children are not asked to read these.)

What a Seed Needs

1. A seed has a tiny baby plant inside it, with a little store of food, wrapped in a seed coat.
2. To start to grow, a seed needs water. It gets wet and swells.
3. It also needs air, and it must not be too cold. Some seeds need light to start, and some need dark.
4. When a seed starts to grow, a tiny root comes out first. The root grows down into the soil and takes in water.
5. Then a shoot grows up towards the light.

How Seeds Get About

1. A plant cannot walk. Its seeds need help to move away from it.
2. Some seeds ride on the wind. A dandelion seed has a fluffy top, like a little umbrella.
3. Some seeds have tiny hooks. They stick to an animal's fur and drop off somewhere else.
4. Some seeds float on water and grow where they wash up.
5. Some heavy fruits just fall off the plant, and some roll away.

Vocabulary

fact, research, report, seed, root, shoot, soil

Differentiation

- **More support:** the child chooses between two fact cards ("Which one is on the chart?") instead of drawing or writing.
- **Stretch:** the child writes a fact in their own words, spelling by sound, and finds where it came from.

- **Access:** non-speaking children place cards or point; blind children use braille fact cards and a tactile chart with a raised line between the columns; no child reads aloud in front of the class.

⚠ Safety

No real seeds are used; pictures and cards only. If real seeds are added, see the unit overview.

Lesson 2: Writing a class report

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children help put together a short class report about seeds with a first sentence, facts and an ending sentence, then each writes one fact sentence of their own.

Length: 30 minutes

Materials

- The class fact chart from lesson 1.
- Sentence strips for the model report: a title strip Seeds; a first-sentence strip Seeds can grow into big plants.; the five fact cards from lesson 1; an ending strip Seeds need help to get to a spot to grow.
- Three large labels: **First sentence**, **Facts**, **Ending** (read by the teacher; children are not expected to sound them out).
- A sentence-starter card: A seed can
- Mini whiteboards and pens, or paper and pencils (one per child), or the child's usual typing or letter-selection tool.
- Optional: braille or large-print copies of the strips.

Steps

✎ Opening (4 min)

Read the fact chart together. "A report tells facts about one topic. What is our topic?" (Seeds.) "A good report has three parts." Put up the three labels: **First sentence**, **Facts**, **Ending**.

✎ Main activity (16 min)

1. **Build the report** (8 min): show the title strip Seeds and the first-sentence strip. "The first sentence tells the reader what the report is about." Children read it together. Then choose three of the five fact cards together and place them under **Facts**; read each one. Last, show the ending strip: "The ending sentence finishes the report, so the reader knows it is done." Read the whole report together, top to bottom.
2. **My fact sentence** (8 min): each child writes one fact sentence about seeds on a whiteboard or paper. They may copy a fact card, use the starter A seed can, or write a fact in their own words, spelling by sound. Children who are not writing by hand place word cards or tell an adult, who writes their exact words.

✓ Discussion questions (with answers) (5 min)

- "Which sentence tells us the topic?" Seeds can grow into big plants.
- "Why does a report need an ending?" So the reader knows it is finished; it sums up.

- "Is I like seeds a fact?" No: it is what someone thinks (an opinion). We will write opinions next lesson.

✓ Closing check (with answers) (5 min)

The teacher mixes up three strips: Seeds can grow into big plants. / Wind can lift a seed. / Seeds need help to get to a spot to grow. Children point to, or hold up fingers for, which one is the **first sentence** (Seeds can grow into big plants.), which is a **fact** (Wind can lift a seed.) and which is the **ending** (Seeds need help to get to a spot to grow.). Note who can sort all three.

The model report

(CC0, original to this draft.)

Seeds

Seeds can grow into big plants. A seed needs to get wet. A root grows in the soil. Wind can lift a seed. Seeds need help to get to a spot to grow.

(The class may choose different facts; any three from the chart work.)

Vocabulary

report, topic, fact, first sentence, ending

Differentiation

- **More support:** the child chooses a fact card and copies or places it; the adult reads the starter.
- **Stretch:** the child writes two fact sentences and their own ending sentence.
- **Access:** non-speaking children place strips under the labels; blind children use braille strips; an adult may scribe the child's own words.

⚠ Safety

Large flat cards and paper only.

Lesson 3: What should the park get? Giving a reason

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children say and write an opinion about what Little Hill park should get, give a reason with because, and add a second reason with also or and.

Length: 30 minutes

Materials

- Mayor Hen's letter (below), on a large sheet for the teacher to read aloud.
- Three large picture cards with labels: a pond, a tree, a sandpit.
- Large word cards for the words to learn: because and also.
- A name card: Duck.
- A sentence-frame strip: I like the ___ best because
- A small word card: and.
- Sentence strips for the model opinion (below).
- Mini whiteboards and pens, or paper and pencils (one per child), or the child's usual typing or letter-selection tool.
- Optional: braille or large-print copies of the frame, cards and strips; tactile versions of the picture cards (for example a smooth blue shape, a bark-textured shape, a sandpaper shape).

Steps

✎ Opening (4 min)

"We have had a letter!" The teacher reads Mayor Hen's letter aloud. "What does Mayor Hen want to know?" (What the park should get.) Show the three picture cards and read the labels together. Show the word card because and teach it: "because tells the reason why." Children say it, clap its two parts (be-cause) and find it again on the frame strip. Then show the word card also and teach it the same way: "also means one more; we use it to add another reason." Children say it and clap its two parts (al-so).

✎ Main activity (16 min)

1. **Fact or opinion?** (3 min): the teacher says two sentences: "A pond has water in it." (fact: everyone can check it) and "A pond is the best thing for the park." (opinion: what someone thinks). Children show thumbs up for fact and a flat hand for opinion.
2. **Model opinion** (5 min): build the model with strips (below). Read it together. Point out the three parts: what I think (I like the pond best), the reason after because, and a second reason with also. "Mayor Hen needs reasons, not just a choice."
3. **My opinion** (8 min): each child chooses one picture card and says to a partner, "I like the ___ best because ...". Then they write it using the frame, spelling their own words by sound. Children who finish add a second sentence with also or and. Children who are

not writing by hand point to a picture card and tell an adult, who writes their exact words; or they choose from reason cards the adult writes from their talk.

✓ Discussion questions (with answers) (5 min)

- "Is I like the tree best a fact or an opinion?" An opinion: it is what one person thinks.
- "What word tells us a reason is coming?" because.
- "Can two people have different opinions and both give good reasons?" Yes. There is no one right choice; a good opinion has a reason.

✓ Closing check (with answers) (5 min)

The teacher reads two sentences: "I like the sandpit best." and "I like the sandpit best because I can dig in it." "Which one would help Mayor Hen more?" Children point or hold up one or two fingers. Answer: the second, because it gives a reason (it has because). Then each child says, or shows on a card, one reason for their own choice. Note who gives a reason.

Mayor Hen's letter (teacher reads aloud)

(CC0, original to this draft. Children are not expected to read it themselves.)

> Dear class,
>
> The park in Little Hill has a bare patch of land. We can put one thing there: a pond, a tree or a sandpit. Which one do you think is best? Please tell me why, so I can choose well.
>
> From, Mayor Hen

The model opinion

(CC0, original to this draft; an example, not from a source.)

I like the pond best because Duck can swim in it. It is also a cool spot on a hot day. The pond is the best!

Vocabulary

opinion, reason, because, also

Differentiation

- **More support:** the child chooses a picture card and finishes the spoken frame; the adult writes the reason and the child copies or traces because.
- **Stretch:** the child writes two reasons and an ending sentence, like the model.
- **Access:** non-speaking children point to a picture card and choose a reason card; blind children use braille frames and tactile picture cards; an adult may scribe the child's own words. Any choice with a reason counts.

⚠ Safety

Picture cards only; no real sand, water or plants in this lesson.

Teacher notes and misconceptions

- Children often give a choice without a reason ("I like the tree"), or a reason that is about themselves only. Both are fine to start with; ask "why?" to draw out the because.
- Some children think an opinion can be wrong. Explain that people can disagree; what makes an opinion stronger is a clear reason.
- The choices are made up. Nobody is asked about their own garden, home or park.

Lesson 4: A letter to Mayor Hen

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children write a short letter to Mayor Hen with a greeting, their opinion and reason, and a closing, putting a comma after Dear Mayor Hen and after From.

Length: 30 minutes

Materials

- Mayor Hen's letter from lesson 3.
- A large word card for the word to learn: Dear.
- A name card: Mayor Hen (read as a name; children are not expected to sound out Mayor).
- A large comma card with a raised outline, so it can be felt as well as seen.
- A large model letter on a sheet or board (below).
- Letter frames (one per child): a top line Dear Mayor Hen with a box after it for the comma; three lines for the body; a line From with a box after it; a line for the child's name.
- Children's opinion sentences from lesson 3.
- "Mayor Hen's post box": a classroom box with a slot.
- Pencils and crayons.
- Optional: braille or large-print letter frames; a typing or letter-selection tool.

Steps

✎ Opening (4 min)

Re-read Mayor Hen's letter. "Mayor Hen wrote to us, so we will write back." Show the word card Dear and teach it: "A letter often starts with Dear and the name of the person." Children read Dear together and find it on the frame. Show the name card Mayor Hen. Point to From on the frame and read it: "We end a letter with From and our name." (In many accents the o in From does not make its usual short sound, so the teacher reads it.)

✎ Main activity (16 min)

1. **The parts of a letter** (5 min): show the model letter. Point to the greeting (Dear Mayor Hen,), the body (the opinion and reasons) and the closing (From, and a name). Hold up the raised comma card: "A comma is a small mark. In a letter, a comma goes after the greeting and after From." Children trace a comma in the air, then find the two commas in the model.
2. **Writing the letter** (11 min): each child fills in a letter frame. They put a comma in each box, copy or rewrite their opinion and reason from lesson 3 in the body, and sign with their first name or a made-up name. Children who finish may add a picture of their choice for the park. Children who are not writing by hand dictate the body to an adult, then place the comma themselves (by pointing, or with a sticky comma) and sign in their own way. When finished, children post their letters in Mayor Hen's post box.

✓ Discussion questions (with answers) (5 min)

- "Who is our letter to?" Mayor Hen. "How do we know?" It says Dear Mayor Hen at the top.
- "Where do the two commas go?" After Dear Mayor Hen and after From.
- "Why do we put our name at the end?" So Mayor Hen knows who the letter is from.

✓ Closing check (with answers) (5 min)

The teacher shows a short letter on the board with the commas missing: Dear Mayor Hen / I like the tree best because Hen can rest in it. / From / Goat. Children say or point to where the two commas go. Answer: after Dear Mayor Hen and after From. Then the teacher asks children to point to the greeting, the body and the closing. Note who places both commas.

The model letter

(CC0, original to this draft; an example, not from a source.)

> Dear Mayor Hen,
>
> I like the pond best because Duck can swim in it. It is also a cool spot on a hot day. The pond is the best!
>
> From, Goat

Vocabulary

letter, greeting, closing, comma, Dear

Differentiation

- **More support:** the frame already has the greeting and closing written; the child adds the two commas, copies one opinion sentence and signs.
- **Stretch:** the child writes two reasons and an ending sentence in the body.
- **Access:** blind children use braille frames and the raised comma card; children with limited hand use may place a sticky comma or point, and an adult writes; any way of signing (name stamp, chosen symbol, adult writing) counts.

⚠ Safety

- Letters go into the classroom post box only. Nothing is posted outside the classroom unless the school's rules allow it (see the unit overview).
- Children sign with a first name or a made-up name; no addresses, surnames or photos.
- Large card and paper only; scissors for the comma card are used by an adult beforehand.

Lesson 5: Partner talk, one change, and sharing

Unit overview - Previous: Lesson 4

Goal: Children listen to a partner's letter, give one kind comment and ask one question, then make one change to their own letter (add a reason with also, or fix a comma).

Length: 30 minutes

Materials

- The children's letters, taken out of Mayor Hen's post box and handed back.
- Three large talk cards with a symbol each: **One kind thing** (a heart), **One question** (a question mark), **One change** (a pencil). The teacher reads the words; children use the symbols, so they are not expected to sound out the words on these cards.
- The model letter from lesson 4, and the word cards also and and.
- The large comma card with a raised outline.
- Pencils, or the child's usual typing or letter-selection tool.
- For the one-to-one check: the class fact chart (lesson 1); the class report strips (lesson 2); the three picture cards (lesson 3); a cut-up letter with four large word pieces plus two large card commas (Dear Mayor Hen / I like the tree best because Hen can rest in it. / From / Goat); the check card (below); a simple record sheet.

Steps

✎ Opening (4 min)

Show the three talk cards; the teacher reads them aloud and children learn the three symbols. Model with a teaching assistant or a puppet, using the model letter: "One kind thing: I like your reason about Duck. One question: what else can Duck do at the pond? One change: I could add also and another reason." Agree the rule: "We talk about the writing, not the writer."

✎ Main activity (16 min)

1. **Partner talk** (6 min): in pairs, each child reads or says their letter to a partner (or the partner reads it, or an adult reads it for them, if the child prefers). The partner gives one kind thing and asks one question. Then they swap. Sharing is opt-in: a child may share with an adult instead of a partner.
2. **One change** (6 min): each child makes one change to their own letter. Choices: add a second reason with also or and; add a missing comma after Dear Mayor Hen or From; add an ending sentence. Children may answer their partner's question in the new sentence. Children who are not writing by hand tell an adult the change, and the adult writes it in a different colour pencil with the child's agreement, or the child places a word card or sticky comma.

3. **Posting again** (4 min): children who want to read their change aloud to the class may do so (no one has to). All letters go back into Mayor Hen's post box. The teacher may read Mayor Hen's reply later (an optional, made-up note thanking the class and saying the reasons helped her choose).

✓ Discussion questions (with answers) (5 min)

- "What did you change, and why?" Answers vary; for example "I added also and a second reason, so Mayor Hen has more reasons."
- "How does a question from a partner help a writer?" It shows what the reader wants to know, so the writer can add it.
- "What makes a kind comment?" It is true, it is about the writing, and it says what worked.

✓ Closing check (with answers) (5 min)

Each child shows the teacher (by pointing, saying or signing) the one change they made in their letter. Note who can show a change. During the week, the teacher also runs the one-to-one check below with each child.

One-to-one check card (about 4 minutes per child)

Done privately, in a quiet corner, spread over the week. Give any of the access options from the unit overview; pointing, AAC, signing and a scribe all count.

1. **Two facts** (outcome 1): point to the fact chart. "Tell me two things you know about seeds." Look for two facts from the chart, for example A seed needs to get wet. and Wind can lift a seed.
2. **Report parts** (outcome 2): show the class report strips. "Point to the first sentence. Point to a fact. Point to the ending." Answers: Seeds can grow into big plants.; any fact strip; Seeds need help to get to a spot to grow. Then: "Tell me one fact sentence about seeds." Any true fact counts.
3. **Opinion and reasons** (outcome 3): show the three picture cards. "Which one should the park get? Why?" Look for a choice, a reason with because, and a second reason (prompt once: "Is there another reason?").
4. **Commas** (outcome 4): give the cut-up letter pieces in a mixed pile. "Put the letter together and add the two commas." Answer: Dear Mayor Hen, at the top, the body, From, and Goat at the end; commas after Dear Mayor Hen and after From.
5. **One change** (outcome 5): look at the child's letter together. "Show me what you changed after partner talk." Look for one change (an added reason, a comma, or an ending).

Record **yes** / **with help** / **not yet** for each item, plus what helped, with no score or pass mark.

Vocabulary

kind comment, question, change, also

Differentiation

- **More support:** the adult offers two change choices only (add a comma, or add also + a reason from a card); the child chooses one.
- **Stretch:** the child makes two changes and explains each one.
- **Access:** non-speaking children use the talk cards to point, and choose comments from cards; blind children use braille letters and the raised comma card; children who find partner talk hard may talk with an adult instead.

⚠ Safety

- Partner talk is kind and opt-in; no child is made to read aloud to the class.
- Letters stay in the classroom post box; names are first names or made-up names only.
- The cut-up letter pieces and card commas are large (bigger than a child's palm), so nothing small enough to swallow is used.

Grade 3 Language and Literacy: Words Built from Parts

Subject: English language and literacy | Grade: 3 | Lessons: 5 | Time: about 40 minutes each | Term: 1

Status: written (unreviewed) | Author: Claude Opus 5.5, AI Village

> **Unreviewed AI draft:** no educator review or classroom testing. Not an official standards alignment, a complete reading program, or a diagnostic instrument. Adapt to students and local practice. Check every activity against your school's rules.
>
> Text-checked by three other agents (Gemini 4 Argon, Gemini 3.8 Flash and Gemini 4 Carbon); see Known gaps.

Back to the grade 3 year plan - Term 1. Builds on grade 2: more vowel teams and longer words, un- and re-, and joining sentences Language and literacy progression

Big idea

Many long words are a short word with parts added. A part at the front (a prefix) or at the end (a suffix) changes the meaning in a way you can learn: un- usually means "not", re- usually means "again", -ful usually means "full of", -less usually means "without", and -ness turns a describing word into a thing (sad, sadness). Splitting a long word into its parts helps you read it and work out what it means. Reading the same short story several times helps it sound like talking.

Outcomes

By the end of the unit, most children can:

1. Read words with the grade 2 vowel teams (**ee**, **ai**, **oa**, **ay**, **igh**, **ow**, **oo**) and with **un-** and **re-**, and say what the word means.
2. Read words ending in **-ful** and **-less** (helpful, hopeful, useless, spotless) and say what they mean.
3. Read words ending in **-ness** (sadness, softness) and use one in a spoken sentence.
4. Split a word of two or three parts into its parts, read each part, then read the whole word (un-help-ful, re-paint-ed, hope-less-ness), and also split two-syllable words with no prefix or suffix (nap-kin, bas-ket).
5. Read a short story aloud several times, getting smoother and using their voice to show how characters feel, and fix a word that does not make sense by reading the sentence again.

Prior knowledge

The written units before this one teach the letters **s a t i p n m o d g c k e u y h w r l f b**; magic e; the vowel teams **ee**, **ai**, **oa**, **ay**, **igh**, **ow** (as in low) and **oo**; the endings **-s**, **-ing** and **-ed**; the prefixes **un-** and **re-**; compound words such as sunrise; and the tricky words I, the, is, my, said, was and to.

This unit adds no new letters. Every word children are asked to read uses only those letters and patterns. Many common grade 3 words use patterns the earlier units do not teach (for example

sh, **ch**, **th**, **ar**, **er**, final **y** as in happy, and the letters **j q v x z**). Those words are left out on purpose; a school that has taught them can add them. That choice is the author's, not from a source.

At the start of lesson 1, check: can the child read rain, unlock and refill? If not, use the grade 2 term 2 unit first.

Lessons

#	Lesson	Focus
1	Check-in: vowel teams, un- and re-	Reading grade 2 patterns again; prefixes mean something
2	-ful and -less	Suffixes that mean "full of" and "without"
3	-ness, and adding more than one part	Making a describing word into a thing; helpfulness
4	Splitting long words	Prefix, base word, suffix; two-syllable words with no affix
5	Reading Hen's Flag with expression	Reading a short story several times; fixing words that don't make sense

Materials (whole class unless noted)

- Word cards (lesson lists are in each lesson), large enough to read from the back of the room
- Part cards: prefix cards (un-, re-), suffix cards (-ful, -less, -ness), and base-word cards, one set per pair (lessons 1 to 4)
- Sorting mat with two columns, "full of" and "without", and a pencil, one per pair (lesson 2; pairs write each word they build in a column, then take the cards apart)
- A soft cloth and a damp sponge (plain water) in a tray (lesson 3)
- Scissors with rounded ends, one per pair (lesson 4)
- Strips of paper with long words written on them, one set per pair (lesson 4)
- The story Hen's Flag (lesson 5 lists all 12 pages), one copy per child, in large print for any child who needs it
- Whiteboard and pens
- Mini whiteboards and pens, one per child

⚠ Safety and access

- Lesson 3: check for allergies before handing round the cloth and sponge; plain water only.
- Scissors: rounded ends; an adult can cut for any child who prefers, or children can fold and tear.
- Any child may answer by pointing, signing, using a communication aid or choosing between two spoken meanings. Their own way counts.
- Low vision: large-print cards and story; let children sit near the board.
- Blind children: braille or tactile part cards if your school has them; part cards can also be told apart by a notch or bump on each prefix card and a different one on each suffix card.
- Deaf children and children who sign: show every word in print as you say it; in lesson 5, expression can be shown with face and hands as well as voice.
- Reading aloud is never forced. A child can read to an adult alone, read with a partner, or listen and point.

- Lesson 5 mentions Hen feeling sad and hopeless. Keep it about Hen; don't ask children about their own sad times.

Assessment

One-to-one, about 3 minutes per child, during lessons 4 and 5. For each item mark **yes**, **with help** or **not yet**.

1. Read refill and unpaid and say what each means. (Outcome 1)
2. Read helpful and spotless and say what each means. (Outcome 2)
3. Read softness and use it in a spoken sentence. (Outcome 3)
4. Split unhelpful into its parts, then read it. (Outcome 4)
5. Split napkin, then read it. (Outcome 4)
6. Read page 6 of Hen's Flag twice; does the second reading sound smoother and show how Hen feels? (Outcome 5)

Sources

Common Core State Standards for English Language Arts, Reading Standards: Foundational Skills, Grade 3, page 17 of https://learning.ccsso.org/wp-content/uploads/2022/11/ELA_Standards1.pdf

Quoted exactly; the unit is not a full alignment.

- RF.3.3: "Know and apply grade-level phonics and word analysis skills in decoding words."
  - RF.3.3a: "Identify and know the meaning of the most common prefixes and derivational suffixes."
  - RF.3.3c: "Decode multisyllable words."
- RF.3.4: "Read with sufficient accuracy and fluency to support comprehension."
  - RF.3.4a: "Read grade-level text with purpose and understanding."
  - RF.3.4b: "Read grade-level prose and poetry orally with accuracy, appropriate rate, and expression on successive readings" (no full stop in the source's grade 3 column)
  - RF.3.4c: "Use context to confirm or self-correct word recognition and understanding, rereading as necessary."

The story Hen's Flag, the word lists and the meanings given for each prefix and suffix are the author's, not from a source.

Known gaps and cautions

- Unreviewed AI draft; not tested in a classroom.
- Three other agents (Gemini 4 Argon, Gemini 3.8 Flash and Gemini 4 Carbon, all at 21c718c) text-checked this unit on 2026-11-11. Argon and Gemini 3.8 Flash reported no errors. Carbon found three: by in the story was not a taught word, bold uses a long-o pattern not yet taught, and one suffix card per pair could not cover the sort. All three were fixed in edec025; Carbon and Argon re-checked the fixes the same day. Those are text checks by AI agents, not a teacher review or classroom test.
- RF.3.3b ("Decode words with common Latin suffixes.") and RF.3.3d ("Read grade-appropriate irregularly spelled words.") are left for term 2, as the grade 3 year plan says. This unit does not teach them.

- Word lists are kept to letters and patterns taught in earlier units, so they leave out many common words (see Prior knowledge). Real grade 3 classes have usually met far more patterns.
- Suffix meanings are given with "usually"; some words don't follow them.
- The year plan mentions "short chapter books"; this unit uses one 12-page original story instead, because no chapter book fits the taught letters.
- No poetry is read, although RF.3.4b names it.

Lesson 1: Check-in: Vowel Teams, un- and re-

Unit overview - Next: Lesson 2

About 40 minutes.

Goal

Children read grade 2 vowel-team words again, and read words with **un-** and **re-**, saying what each one means.

Materials

- Word cards: rain, feet, boat, play, night, low, moon
- Word cards: lock, unlock, pack, unpack, safe, unsafe, paid, unpaid, seen, unseen
- Word cards: fill, refill, paint, repaint, tell, retell, play, replay, use, reuse
- Part cards un- and re-, and base-word cards lock, pack, safe, fill, paint, tell, one set per pair
- Whiteboard and pens; mini whiteboards and pens, one per child

Steps

✎ Opening (5 min)

Hold up the vowel-team cards one at a time: rain, feet, boat, play, night, low, moon. The class reads each one together. Note any child who hesitates; they get extra time in the main activity.

✎ Main activity (25 min)

1. **Un- means "not"** (7 min): show lock, then put the un- card in front: unlock. "What does it mean?" To open the lock; the opposite of lock. Do the same with pack/unpack, safe/unsafe, paid/unpaid, seen/unseen. Write on the board: "un- usually means not, or the opposite."
2. **Re- means "again"** (7 min): show fill, then put re- in front: refill. "What does it mean?" Fill it again. Do the same with paint/repaint, tell/retell, play/replay, use/reuse. Write: "re- usually means again."
3. **Pairs build words** (8 min): each pair has the part cards un- and re- and the base-word cards. One child builds a word; the other reads it and says what it means. Swap. Ask them to find a word that does not make sense (relock is a real word; unpaint is not one we use). Talk about it: not every part goes with every word.
4. **Write one** (3 min): each child writes one un- word and one re- word on a mini whiteboard and holds it up.

✓ Discussion questions (5 min)

- "What does unsafe mean?" Not safe.

- "What does retell mean?" Tell it again.
- "If you repaint a fence, was it painted before?" Yes; re- means again.

✓ Closing check (5 min)

Show unpack and replay. Each child reads them to a partner and says what they mean.

Answers: unpack: take things out, the opposite of pack. replay: play it again.

Vocabulary

prefix, base word, un-, re-, meaning

Differentiation

- **Support:** work with only un- first; read the base word before adding the prefix.
- **Stretch:** find a word where re- does not mean "again" (for example red: the re there is not a prefix).
- **Tactile:** use part cards with a notch on the prefix cards so children can feel which piece goes at the front.

⚠ Safety

No special risks. Make sure word cards are big enough to read without leaning over others.

Teacher notes and misconceptions

- Children sometimes think any word starting with re or un has a prefix (red, under). The test: take the part off; is what is left a real word with a linked meaning?
- Un- can mean "not" (unsafe) or "do the opposite" (unlock). Both count.
- The word list uses only letters and patterns from earlier units, so it leaves out common words such as unhappy (final y) and rewrite (silent w).

Lesson 2: -ful and -less

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 40 minutes.

Goal

Children read words ending in **-ful** and **-less** and say what they mean.

Materials

- Word cards: help, helpful, helpless; hope, hopeful, hopeless; use, useful, useless; pain, painful, painless; rest, restful; play, playful; end, endless; spot, spotless; sleep, sleepless
- Part cards -ful and -less, and base-word cards help, hope, use, pain, rest, play, end, spot, sleep, one set per pair
- Sorting mat with two columns, "full of" and "without", one per pair (a sheet of paper folded in half works; an adult reads the headings with the class, since of and without use letters not yet taught), and a pencil, one per pair
- Whiteboard and pens; mini whiteboards and pens, one per child

Steps

✎ Opening (5 min)

Quick review: show unlock, refill and unseen. Children read each one and say what it means. Then: "Today the part goes at the end."

✎ Main activity (25 min)

1. **-ful means "full of"** (7 min): show help, then add -ful: helpful. "Full of help." Do the same with hope/hopeful, use/useful, rest/restful, play/playful. Point out that -ful has one l at the end. Write on the board: "-ful usually means full of."
2. **-less means "without"** (7 min): show help, then add -less: helpless. "Without help." Do the same with hope/hopeless, use/useless, end/endless, spot/spotless, sleep/sleepless. Write: "-less usually means without."
3. **Same base, two endings** (4 min): put hopeful and hopeless side by side. "Are these the same or opposite?" Opposite. Do the same with useful/useless and painful/painless.
4. **Pairs sort** (7 min): pairs build a word from a base-word card and a part card, read it, and write it in the "full of" or "without" column of the mat. Then they take the cards apart and build the next word. They say each meaning out loud.

✓ Discussion questions (5 min)

- "A spotless plate: does it have spots?" No; it is without spots, very clean.
- "A restful day: is it busy or calm?" Calm; full of rest.

- "Is endless rain good news for a picnic?" No; it seems to go on without an end.

✓ Closing check (5 min)

Show painless and playful. Each child writes F (full of) or W (without) for each on a mini whiteboard, then reads the word to a partner.

Answers: painless: W, without pain. playful: F, full of play.

Vocabulary

suffix, -ful, -less, opposite, meaning

Differentiation

- **Support:** start with three pairs only (helpful/helpless, hopeful/hopeless, useful/useless); cover the suffix, read the base word, then uncover it.
- **Stretch:** make a spoken sentence with both words in a pair: "The map was useful, but the old one was useless."
- **Tactile:** use part cards with a notch on the suffix cards, different from the prefix notch, so children can feel which piece goes at the end.

⚠ Safety

No special risks. Talk about painful and sleepless lightly, as words; don't ask children about their own pain or sleep.

Teacher notes and misconceptions

- Children may spell -ful as full. The suffix has one l.
- Hope + -ful keeps the e: hopeful. The same is true of use/useful/useless. The base word does not change in any word this lesson uses.
- Not every -ful word means "full of" in a literal way (playful means liking to play). "Usually" is the honest word.

Lesson 3: -ness, and Adding More Than One Part

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 40 minutes.

Goal

Children read words ending in **-ness**, use one in a spoken sentence, and read words with two suffixes, such as helpfulness.

Materials

- Word cards: sad, sadness; red, redness; wet, wetness; soft, softness; still, stillness; dim, dimness; fit, fitness; damp, dampness; late, lateness
- Word cards: helpfulness, playfulness, usefulness, hopelessness, restlessness
- Part cards -ful, -less and -ness, and base-word cards sad, soft, still, help, play, use, hope, rest, one set per pair
- The un- part card from lesson 1, one per pair (for the stretch task)
- A soft cloth and a damp sponge in a tray (for the opening)
- Whiteboard and pens; mini whiteboards and pens, one per child

Steps

✎ Opening (5 min)

Pass the soft cloth and the damp sponge round in the tray (children can touch or just look). "The cloth is soft. Its softness is how soft it is. The sponge is damp. Its dampness is how damp it is." Write soft and softness on the board, and underline -ness.

✎ Main activity (25 min)

1. **-ness makes a thing** (8 min): show sad, then add -ness: sadness. "Sad is how Hen feels. Sadness is the feeling itself." Read redness, wetness, stillness, dimness, fitness, dampness and lateness the same way: base word first, then the whole word. Write: "-ness usually turns a describing word into a thing."
2. **Say it in a sentence** (5 min): pairs choose two -ness words and say a sentence with each to each other: "The stillness of the pond..." Share three with the class.
3. **Two parts at the end** (7 min): build help + -ful + -ness with the part cards: helpfulness. Read it in three parts, then as one word. "Full of help... the thing of being full of help." Do the same with playfulness, usefulness, then hope + -less + -ness (hopelessness) and rest + -less + -ness (restlessness).
4. **Pairs build** (5 min): pairs use their part cards to build as many real words as they can from one base word (for example help, helpful, helpless, helpfulness), and read each one.

✓ Discussion questions (5 min)

- "What is wetness?" How wet something is.
- "In helpfulness, which part comes first, -ful or -ness?" -ful, then -ness.
- "Is sadness a describing word or a thing?" A thing (a feeling).

✓ Closing check (5 min)

Each child reads dimness and usefulness to a partner, then splits usefulness into parts on a mini whiteboard.

Answers: dim + ness; use + ful + ness.

Vocabulary

suffix, -ness, describing word, base word

Differentiation

- **Support:** stay with one-suffix words (sadness, softness); cover the suffix, read, uncover.
- **Stretch:** build a word with three added parts from the cards: is there one? (unhelpfulness: un- + help + -ful + -ness.) The un- card from lesson 1 can be added to the set.
- **Tactile:** feel the cloth and sponge; use notched part cards.

⚠ Safety

- Check for allergies before handing round the cloth and sponge; use plain water only in the sponge.
- Sadness and hopelessness are taught as words about story characters. Don't ask children about their own sad times.

Teacher notes and misconceptions

- In sadness, -ness follows a word ending in d, so no letter doubles. Children may write sadnes; -ness always has two s letters.
- Lateness keeps the magic e of late. No base word in this lesson changes its spelling.
- Children may read hopelessness as one long run of letters. Splitting at each part first is the whole point of the lesson.

Lesson 4: Splitting Long Words

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 40 minutes.

Goal

Children split a word of two or three parts into its parts, read each part, then read the whole word. They also split two-syllable words that have no prefix or suffix.

Materials

- Paper strips with these words written large, one set per pair: unhelpful, repainted, unlocking, refilled, hopelessness, playfulness, unpacked, spotless
- Paper strips with these words, one set per pair: napkin, basket, picnic, magnet, rabbit, kitten
- Scissors with rounded ends, one per pair
- Whiteboard and pens; mini whiteboards and pens, one per child

Steps

✎ Opening (5 min)

Write unhelpful on the board. "This looks long. Who can see a part we know?" Draw a line after un and before ful: un | help | ful. Read each part, then the whole word. "Not full of help."

✎ Main activity (25 min)

1. **Find the parts** (6 min): with the class, split repainted (re | paint | ed) and hopelessness (hope | less | ness) on the board. Steps every time: find a prefix at the front, find suffixes at the end, read what is left (the base word), then put it all together.
2. **Cut and read** (8 min): pairs take the first set of strips. One child says where to cut; the other cuts (or folds and tears). They read each part, then push the parts together and read the whole word. Then they say what it means.
3. **Words with no prefix or suffix** (6 min): show napkin. "No prefix, no suffix, but still long." Split it between the two middle consonants: nap | kin. Read each part, then the whole word. Do the same with basket (bas | ket), picnic (pic | nic) and magnet (mag | net). For rabbit and kitten, split between the double letters: rab | bit, kit | ten.
4. **Pairs cut the second set** (5 min): pairs split the second set of strips the same way and read them to each other.

✓ Discussion questions (5 min)

- "What is the base word in unlocking?" lock.
- "How many parts does playfulness have?" Three: play, ful, ness.

- "Where do we split basket?" Between s and k: bas | ket.

✓ Closing check (5 min)

Each child splits refilled and magnet on a mini whiteboard with lines, then reads both words to a partner. One-to-one assessment (see the unit overview) can start now, with an adult working with a few children while others finish.

Answers: re | fill | ed; mag | net.

Vocabulary

prefix, suffix, base word, split, syllable

Differentiation

- **Support:** give strips with the split already marked in pencil; the child cuts on the line and reads.
- **Stretch:** write a long word for a partner to split, using part cards from earlier lessons.
- **Tactile:** fold and tear instead of cutting; feel the separate pieces before pushing them back together.

⚠ Safety

- Rounded-end scissors only. Children who don't want to cut can fold and tear, or an adult can cut.
- Collect scissors before the discussion.

Teacher notes and misconceptions

- Refilled has a double l because fill already ends in ll; nothing is added. Children may think the -ed doubled it.
- -ed sounds different in different words: /d/ in refilled, /t/ in unpacked, and an extra beat, /id/, in repainted. Splitting it off as a part still works for all three.
- "Split between two middle consonants" is a useful first try, not a rule that always works. It works for every word in this lesson.

Lesson 5: Reading Hen's Flag with Expression

Unit overview - Previous: Lesson 4

About 40 minutes.

Goal

Children read a short story several times, getting smoother each time and using their voice to show how the characters feel. They notice when a word does not make sense and read the sentence again to fix it.

Materials

- The story Hen's Flag (below), one copy per child, in large print for any child who needs it
- Word cards: endless, useless, hopeless, sadness, helpful, repainted, spotless, hopeful
- Whiteboard and pens

Steps

✎ Opening (5 min)

Show the word cards one at a time. Children split each one into parts in their heads, then read it: end-less, use-less, hope-less, sad-ness, help-ful, re-paint-ed, spot-less, hope-ful. "All of these are in today's story."

✎ Main activity (25 min)

1. **First read: listen and follow** (6 min): read the whole story aloud while children follow with a finger. Read it with feeling: long and slow for the endless rain on page 3, cross on page 5, sad on page 6, bright on page 7.
2. **Second read: pairs** (6 min): pairs read it together, one page each, helping each other split long words into parts.
3. **Third read: voices** (7 min): look at the speech marks. "Who is talking on page 6? How does Hen feel?" Sad, hopeless. "So how should Hen's voice sound?" Slow, quiet. "Page 7: how does Duck sound?" Bright, kind. Point out that **?** makes the voice go up and **!** makes it strong. Pairs read pages 5 to 8 again, using voices. Children who sign can show the feelings with face and hands.
4. **Does it make sense?** (6 min): read page 9 aloud with one word swapped: "Hen got red pain and repainted it." Children put up a hand when something sounds wrong. "What should it be?" Paint. "How did you know?" You can't repaint with pain; reading the sentence again shows paint fits. Do two more: page 10, "Duck held the flag up in the sand" (sun), and page 11, "the flag was spotted" (spotless: the paint was fixed).

✓ Discussion questions (5 min)

- "Why did Hen feel hopeless?" The rain made the red paint run, so the flag was useless.
- "How did Duck help?" Duck held the flag while Hen repainted it, then held it up in the sun.
- "How did Hen feel at the end?" Hopeful.

✓ Closing check (5 min)

Each child reads page 6 to a partner (or an adult) twice. The partner says one thing that got better the second time. One-to-one assessment item 6 (see the unit overview) uses this same page.

Answer: any honest improvement counts: smoother, fewer stops, more feeling in Hen's voice.

The story: Hen's Flag

An example written for this unit, not from a source. Every word uses letters and patterns taught in earlier units, plus the tricky words I, the, said, was and to.

1. Hen had a big red flag. It said "Hen's Buns".
2. Hen kept the flag up at a bun stand on a hill.
3. In the night, rain fell and fell. It felt endless.
4. At sunrise, Hen got up and ran up to the stand.
5. The flag was wet, and the red paint had run. It was useless!
6. "I am hopeless at painting," said Hen. Hen sat on a step in sadness.
7. Duck came up to Hen. "Hopeless? Not a bit!" said Duck.
8. "Let us repaint it. I am a helpful duck."
9. Duck held the flag. Hen got red paint and repainted it, a bit at a time.
10. Duck held the flag up in the sun.
11. At last the flag was spotless. "Hen's Buns!" It was big and bright.
12. Hen got a hot bun and handed it to Duck. "I am not hopeless," said Hen. "I am hopeful!"

Vocabulary

expression, speech marks, question mark, exclamation mark, reread

Differentiation

- **Support:** read the story with an adult first, or echo-read: the adult reads a page, the child reads it back.
- **Stretch:** read the whole story to a younger class, or read Duck's lines in a pair with one child as Hen and one as Duck.
- **Tactile and low vision:** large-print or braille copy if your school has one; any child can follow by listening instead.

⚠ Safety

- Reading aloud is never forced; a child can read to an adult alone or listen and point.
- Keep the sadness and hopelessness about Hen. Don't ask children about their own sad times.

Teacher notes and misconceptions

- Fast is not the same as fluent. Reading at a talking pace, with feeling, is the goal, not racing.
- Children may read Hen's as hens. The small mark means the buns belong to Hen, as with Duck's in grade 2.
- The year plan mentions "short chapter books"; this unit uses one short original story because no chapter book fits the taught letters. Schools that have taught more patterns can use a real chapter book.

Grade 3 Language and Literacy: Longer Words and Short Reports

Subject: English language and literacy | Grade: 3 | Lessons: 5 | Time: about 40 minutes each | Term: 2

Status: written (unreviewed) | Author: Claude Opus 5.5, AI Village

> **Unreviewed AI draft:** no educator review or classroom testing. Not an official standards alignment, a complete reading program, or a diagnostic instrument. Adapt to students and local practice. Check every activity against your school's rules.
>
> Text-checked by four other agents (Gemini 3.5 Flash, Gemini 3.8 Flash, Gemini 4 Carbon and Gemini 4 Argon); see Known gaps.

Back to the grade 3 year plan - Term 2. Builds on grade 3 term 1: words built from parts; grade 2: writing for a reason Language and literacy progression

Big idea

Long words are easier when you know their parts. Some endings change what kind of word it is: pay is something you do, but a payment is a thing. Some endings are not said the way they look: -tion is said "shun". Some short, common words are tricky because a part of them does not follow the rules, so we learn that part by heart. Writers use what they know to tell a reader about a topic: a short report says what the topic is, puts facts that belong together in groups, adds a picture where it helps, and finishes with a sentence that sums up.

Outcomes

By the end of the unit, most children can:

1. Read words ending in **-ment** and **-able** (payment, agreement, bendable, refillable) and say what they mean.
2. Read words ending in **-tion** (action, collection, subtraction), knowing that the ending is said "shun" even though it is not spelled that way.
3. Read eight tricky words (of, do, two, one, some, come, could, would) and point to the part of each that does not follow the rules.
4. Plan a short report about measuring the weather: choose facts that are about the topic, put them in two groups under headings, and draw a picture with labels.
5. Write the report with an opening sentence, the two groups of facts joined with linking words (also, another, and, more, but), and a concluding sentence, then read it to a partner.

Prior knowledge

The written units before this one teach the letters **s a t i p n m o d g c k e u y h w r l f b**; magic e; the vowel teams **ee**, **ai**, **oa**, **ay**, **igh**, **ow** (as in low) and **oo**; the endings **-s**, **-ing** and **-ed**; the prefixes **un-** and **re-**; the suffixes **-ful**, **-less** and **-ness**; compound words; and the tricky words I, the, is, my, said, was and to.

This unit adds the suffixes **-ment**, **-able** and **-tion** and eight tricky words. Every word children are asked to decode in lessons 1 to 3 uses only those letters and patterns. The fact cards, the model report and the word bank in lessons 4 and 5 use words with patterns the earlier units do not teach (for example weather, thermometer, another); the teacher reads them aloud first, and children copy them from the word bank rather than decode them. Many common grade 3 words use patterns the earlier units do not teach (for example **sh**, **ch**, **th**, **ar**, **er** and final **y**). A school that has taught them can add more words.

The report is about the weather, so it fits best while the class is doing the grade 3 science unit Weather over a season (term 2). The model report is about magnets, from the term 1 science unit Magnets.

At the start of lesson 1, check: can the child read helpful, unlock and softness? If not, use the term 1 unit first.

Lessons

#	Lesson	Focus
1	-ment and -able	Suffixes that make a thing (payment) and mean "can be" (bendable)
2	-tion: an ending said "shun"	act and action; splitting three-part words
3	Tricky words	Eight common words with a part to learn by heart
4	Planning a short report	Reading a model report; sorting fact cards into two groups; a labelled picture
5	Writing and sharing the report	Opening sentence, two groups, linking words, concluding sentence; reading to a partner

Materials (whole class unless noted)

- Word cards (lesson lists are in each lesson), large enough to read from the back of the room (lessons 1 to 3)
- Part cards, one set per pair (lesson 1): base-word cards pay, state, agree, content, play, print, bend, refill, lock, stack, and one suffix card each for -ment and -able
- Sorting mat with two columns, "a thing" and "can be done", and a pencil, one per pair (lesson 1; pairs write each word they build in a column, then take the cards apart)
- Word strips with the twelve -tion words from lesson 2, one set per pair, and a pencil and a coloured pencil per pair (lesson 2)
- Tricky-word cards (the eight words), one large set for the board and one small set per pair, and a coloured pencil per pair (lesson 3; the large some, could and two cards are used again in lesson 4)
- Sentence strips (the six sentences in lesson 3), one set per pair (lesson 3)
- The model report Magnets (lesson 4 gives the full text), on a large sheet or the board (lessons 4 and 5)
- Fact cards (the twelve cards in lesson 4), one set per pair (lessons 4 and 5)
- Planning sheet, one per child (lessons 4 and 5): a title line, two heading boxes with three lines each, and a picture box
- Word bank sheet, one per child (lessons 4 and 5; the list is in lesson 4)
- Lined paper, one or two sheets per child (lesson 5)
- Report checklist card, one per child (lesson 5; the five checks are in lesson 5)
- Pencils and coloured pencils, one each per child (lessons 4 and 5)

- Whiteboard and pens
- Mini whiteboards and pens, one per child (lessons 1 to 3)

⚠ Safety and access

- No scissors, food or liquids are used in this unit.
- Any child may answer by pointing, signing, using a communication aid or choosing between two spoken meanings. Their own way counts.
- Writing: a child can dictate the report to an adult, type it, build it from cut-out word bank words or record it. The thinking (choosing and grouping facts, linking them, summing up) is what counts, not handwriting.
- Low vision: large-print cards, strips and report sheets; let children sit near the board.
- Blind children: braille or tactile cards if your school has them; suffix cards can be told apart by a notch on -ment and two notches on -able. The picture in the report can be a tactile picture (string, card shapes) with braille or spoken labels.
- Deaf children and children who sign: show every word in print as you say it. "Said 'shun'" in lesson 2 means the same ending every time; show it with the written part and a sign or gesture the class agrees on.
- Reading aloud is never forced. A child can read to an adult alone, read with a partner, or listen and point.
- Storms: the fact cards mention a storm once. Keep it about what the weather is; if a child is worried about storms, they can leave that card out.
- Children write about the class's weather and the fact cards, not about their own homes or families.

Assessment

One-to-one, about 3 minutes per child, during lessons 4 and 5, plus a look at each child's finished report. For each item mark **yes**, **with help** or **not yet**.

1. Read payment and bendable and say what each means. (Outcome 1)
2. Read collection and subtraction; point to the part that is said "shun". (Outcome 2)
3. Read could, two and some; point to the tricky part of one of them. (Outcome 3)
4. Shown four fact cards (two about weather tools, one about a kind of weather, one about magnets), put the two tool cards under the heading "Tools" and say which card is not about the weather. (Outcome 4)
5. In the finished report: is there an opening sentence that says the topic, and a concluding sentence? (Outcome 5)
6. In the finished report: are there two groups of facts under headings, at least one linking word, and a picture with at least two labels? (Outcomes 4 and 5)

Sources

Common Core State Standards for English Language Arts, Grade 3: Reading Standards: Foundational Skills (page 17) and Writing Standards (page 20) of https://learning.ccsso.org/wp-content/uploads/2022/11/ELA_Standards1.pdf

Quoted exactly; the unit is not a full alignment.

- RF.3.3: "Know and apply grade-level phonics and word analysis skills in decoding words."
  - RF.3.3a: "Identify and know the meaning of the most common prefixes and derivational suffixes."
  - RF.3.3b: "Decode words with common Latin suffixes."
  - RF.3.3c: "Decode multisyllable words."
  - RF.3.3d: "Read grade-appropriate irregularly spelled words."
- W.3.2: "Write informative/explanatory texts to examine a topic and convey ideas and information clearly."
  - W.3.2a: "Introduce a topic and group related information together; include illustrations when useful to aiding comprehension."
  - W.3.2b: "Develop the topic with facts, definitions, and details."
  - W.3.2c: "Use linking words and phrases (e.g., also, another, and, more, but) to connect ideas within categories of information."
  - W.3.2d: "Provide a concluding statement or section."

Wikipedia, "English orthography": https://en.wikipedia.org/wiki/English_orthography

- It says that in English "there is not a one-to-one correspondence between letters and sounds", and gives could as one of nine ways the letters **ou** can be said. Lesson 3 uses that idea.

Wikipedia, "Morphological derivation": https://en.wikipedia.org/wiki/Morphological_derivation

- It lists "-ful, -able, im-, un-, -ing, -er" as examples of derivational morphemes in English, and says a derivational suffix can change a word into a different part of speech. Lesson 1 uses that idea (pay to payment).

The model report, the fact cards, the word lists, the meanings given for each suffix and the choice of tricky words are the author's, not from a source.

Known gaps and cautions

- Unreviewed AI draft; not tested in a classroom.
- Four other agents (Gemini 3.5 Flash and Gemini 3.8 Flash at 783e0dd, Gemini 4 Carbon at 783e0dd/5010efc, Gemini 4 Argon at b6fa3dc) text-checked this unit on 2026-11-12 and reported no errors; Carbon made one optional note about a lesson 1 example, now changed. Those are text checks by AI agents, not teacher reviews or classroom tests.
- Which suffixes count as "common Latin suffixes" (RF.3.3b) is the author's choice: this unit uses -ment, -able and -tion. The standard gives no list.
- Suffix meanings are given with "usually"; some words don't follow them (comment and table end in the same letters but are not a base word plus a suffix).
- -tion is said "shun" in most kinds of English, but not exactly the same everywhere. Use the way your class says it.
- The spelling changes when some suffixes are added (dropping the e in usable, changing y to i) are not taught. Every word in lesson 1 keeps its base word whole.
- The tricky-word list is the author's choice of eight common words. Your school may have its own list and order.
- The fact cards, model report and word bank use patterns not yet taught (see Prior knowledge). Children hear them read aloud first and copy them; spelling of those words is not marked.

- The report has two groups of facts. W.3.2 does not say how many; a school could add a third group.
- Lesson 3 uses a "find the tricky part and learn it by heart" method, often called "heart words". That is a teaching choice, not something the standards require.
- Addition is add + i + -tion; lesson 2 says this plainly rather than teaching a rule. -tion words with a long vowel before the ending (nation, motion) are left for later.
- The lesson 3 stretch task uses should, which needs **sh** (not taught in the earlier units); it is read to children who are not ready.
- RF.3.4 (fluency) is not a focus of this unit, although children read their reports aloud.
- No poetry is read.

Lesson 1: -ment and -able

Unit overview - Next: Lesson 2

About 40 minutes.

Goal

Children read words ending in **-ment** and **-able** and say what they mean. They learn that **-ment** usually turns a word into a thing or an idea (pay, payment), and **-able** usually means "can be" (bendable means "can be bent").

Materials

- Word cards: helpful, unlock, softness (opening); payment, statement, agreement, contentment, playable, printable, bendable, stackable, lockable, refillable; comment
- Part cards, one set per pair: base-word cards pay, state, agree, content, play, print, bend, refill, lock, stack, and one suffix card each for -ment and -able
- Sorting mat with two columns, "a thing" and "can be done", and a pencil, one per pair
- Whiteboard and pens
- Mini whiteboards and pens, one per child

Steps

✎ Opening (5 min)

1. Show helpful, unlock and softness. The class reads each one, then says the parts: help-ful, un-lock, soft-ness.
2. Ask: "What does -ful do to help?" (It makes it mean "full of help".) "What does un- do to lock?" (It makes it mean the opposite: open it.)
3. Say: "Today we meet two more endings. They change what kind of word it is."

✎ Main activity (25 min)

1. **Meet -ment (6 min).** Write pay on the board. "Pay is something you do: you pay for a bus ticket." Add **-ment**: payment. "A payment is a thing: the money you pay." Do the same with state to statement (a thing you say or write), agree to agreement (a thing two people agree on) and content to contentment (content means happy with what you have; contentment is that feeling). Write the rule on the board: **-ment usually makes a word into a thing or an idea.** Children read all four words from the cards, first the parts, then the whole word.
2. **Meet -able (6 min).** Hold up a word card with bend. "You can bend a straw. A straw is bendable: it can be bent." Write the rule: **-able usually means "can be".** Read playable (can be played), printable (can be printed), stackable (can be stacked, one on top of another), lockable (can be locked) and refillable (can be filled again: re-fill-able, three parts). Children say the meaning each time with "can be": "Lockable means it can be locked."

3. **Build and sort in pairs (9 min).** Give each pair the part cards and a sorting mat. One child chooses a base word and a suffix card, builds a word and reads it. The partner says what it means. If it is a real word from today, they write it in the right column ("a thing" for -ment words, "can be done" for -able words), then take the cards apart and swap jobs. Not every base word goes with both endings: payable is a real word, but bendment is not. If a pair builds a word they are not sure about, they put it to one side to ask about.
4. **One sentence each (4 min).** On mini whiteboards, each child writes one sentence using a word from their mat, for example My bag is lockable. or Ted made an agreement. Two or three children read theirs aloud.

✓ Discussion questions (5 min)

- "Is comment the word com with -ment added?" (No. Com is not a word on its own. Comment just ends in the same letters. Not every word ending in **-ment** has a suffix.)
- "What could unbendable mean?" (Cannot be bent: un-bend-able, three parts.)
- "Is a payment something you do, or a thing?" (A thing. Pay is what you do.)

✓ Closing check (5 min)

Children answer on mini whiteboards, by pointing to a word card, or by saying it.

1. Show statement. "Read it. Is it a thing, or something that can be done?" (A thing: something you say or write.)
2. Show stackable. "Read it. What does it mean?" (It can be stacked.)
3. "Which word means 'can be printed': printable or payment?" (printable)
4. "Split refillable into its parts." (re-fill-able)

Vocabulary

suffix, base word, -ment, -able, payment, statement, agreement, contentment, playable, printable, bendable, stackable, lockable, refillable

Differentiation

- **Support:** work with the four -ment words first, then the -able words. Keep the two rules on the board, each with a small picture (a coin for payment, a bending straw for bendable).
- **Stretch:** build three-part words (re-fill-able, un-bend-able, un-lock-able) and say what each means. Unlockable is tricky: it can mean "cannot be locked" or "can be unlocked". Talk about how the sentence tells you which.
- **Tactile:** suffix cards with a notch on -ment and two notches on -able, so a child can feel which ending they are holding.

⚠ Safety

- No special hazards. Keep part cards on the table.

Teacher notes and misconceptions

- Some children read -ment as "meant". Model it as one short beat: pay-ment.
- Contentment uses content as in "happy with what you have", said with the stress at the end. Children may know content as in "the content of a box". You can leave contentment out if it confuses.
- **-able** words in this lesson keep the base word whole. Words that drop an **e** (usable) are left for later.
- Rules here use "usually". Children who find a word that breaks a rule have spotted something real; praise it.

Lesson 2: -tion: an ending said "shun"

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 40 minutes.

Goal

Children read words ending in **-tion**. They learn that **-tion** is said "shun", even though it is not spelled that way, and that many **-tion** words are built from a word they know (act, action). They split longer words into parts to read them.

Materials

- Word cards: payment, bendable (opening); act, action, collect, collection, connect, connection, inspect, inspection, subtract, subtraction, add, addition; fiction, section, function, fraction, mention, intention
- Word strips with the twelve -tion words, one set per pair: action, collection, connection, inspection, subtraction, addition, fiction, section, function, fraction, mention, intention
- A pencil and a coloured pencil, one each per pair
- Whiteboard and pens
- Mini whiteboards and pens, one per child

Steps

✎ Opening (5 min)

1. Show payment and bendable. Children read them and say what they mean. (A thing you pay; can be bent.)
2. Say: "Today's ending is a bit of a trick. It is not said the way it looks."

✎ Main activity (25 min)

1. **Meet -tion (6 min).** Write act on the board. "To act is to do something." Add **-ion**, so the word ends in **-tion**: action. Read it: ac-tion. "The end is said 'shun'. The letters **t-i** do not say /t/ /i/ here; together with **-on** they say 'shun'." Write the rule on the board: **-tion is said "shun".** Do the same with collect to collection and connect to connection. Children read each pair from the cards: first the base word, then the long word.
2. **Base word and -tion (6 min).** Show inspect and inspection, subtract and subtraction, then add and addition. "Addition is a bit different: it is add, then i, then tion: ad-di-tion." Children say the meaning of each: an action is something done; a collection is things collected; a connection is where things join; an inspection is a careful look; a subtraction is a take-away sum; an addition is an adding sum.

3. **Mark and split in pairs (9 min).** Give each pair the twelve word strips, a pencil and a coloured pencil. For each strip, one child reads it, the partner checks, then they:
    - colour the letters **t-i** with the coloured pencil, to show where "shun" starts;
    - draw a pencil line between the parts, as in sub | trac | tion or ac | tion.

    The six words without a base word on the board (fiction, section, function, fraction, mention, intention) are read the same way: split, then read each part. Lines may fall in slightly different places; any split that helps the child read the word is fine.
4. **Sort the words (4 min).** On mini whiteboards, children write two lists: words with a base word they know (action, collection, connection, inspection, subtraction, addition) and words without one. If a child gives a good reason for moving a word, accept it.

✓ Discussion questions (5 min)

- "What is the same in all twelve words?" (They all end in **-tion**, said "shun".)
- "Fiction is a kind of book. What kind?" (Made-up stories, not facts.) "Next week we write facts, not fiction."
- "How many parts are in subtraction?" (Three: sub-trac-tion.)

✓ Closing check (5 min)

Children answer on mini whiteboards, by pointing to a word card, or by saying it.

1. Show collection. "Read it. Point to where 'shun' starts." (collection; the **t-i**.)
2. "What word is connect with **-ion** added?" (connection)
3. Show subtraction. "Read it and split it into parts." (sub-trac-tion)
4. Show mention. "Read it." (mention)

Vocabulary

-tion, base word, part, action, collection, connection, inspection, subtraction, addition, fiction, section, function, fraction, mention, intention

Differentiation

- **Support:** work with the six word pairs first (act and action and so on), covering the end of the long word and then showing it. Use the base word to read the start of the long word.
- **Stretch:** find which base words take both **-tion** and an ending from lesson 1 or the term 1 unit (connect, connection, connected; collect, collection, collectable) and write a sentence using two of them.
- **Tactile:** word strips with a raised line or a fold between the parts, so a child can feel the parts before reading.

⚠ Safety

- No special hazards. Children draw lines on the strips; nothing is cut.

Teacher notes and misconceptions

- Some children read **-tion** as "tee-on" or "tie-on". Point to the coloured **t-i** each time and say "shun".
- The words in this lesson have a short vowel before **-tion** (ac-tion, sec-tion, fic-tion), so the earlier letters read as taught. Words like nation and motion have a long vowel before **-tion** and are left for later.
- Addition has an extra i between add and -tion; say this plainly rather than making a rule.
- Function and intention may be new words for some children. Give a short meaning (a function is a job something does; an intention is what you mean to do) and do not test them on meanings.
- The lesson uses only **-tion**. Other endings said "shun" or "zhun" (-sion in mansion and vision) are left for a later year.

Lesson 3: Tricky words

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 40 minutes.

Goal

Children read eight common words that have a part that does not follow the rules: of, do, two, one, some, come, could and would. For each word, they sound out the parts that do follow the rules and learn the tricky part by heart.

Materials

- Word cards: action, subtraction (opening); said, was (review)
- Tricky-word cards (of, do, two, one, some, come, could, would): one large set for the board and one small set per pair
- A coloured pencil, one per pair
- Sentence strips, one set of six per pair (the sentences are in step 3 below)
- Whiteboard and pens
- Mini whiteboards and pens, one per child

Steps

✎ Opening (5 min)

1. Show action and subtraction. Children read them and point to where "shun" starts.
2. Show said and was, two tricky words from earlier years. "Which part of said is tricky?" (The **ai** says /e/, not /ay/.) "Which part of was?" (The **a** does not say /a/ as in cat, and the **s** says /z/.)
3. Say: "Today we learn eight more tricky words. Most of each word follows the rules. We find the tricky part and learn just that bit by heart."

✎ Main activity (25 min)

1. **Find the tricky part (10 min).** Take the large cards one at a time. For each word, say it, sound the letters that follow the rules, and ask the class which part does not. Draw a heart above the tricky part on the board.
    - of: the **o** says /u/ and the **f** says /v/.
    - do: the **o** says /oo/.
    - two: the **w** is silent and the **o** says /oo/. Two means the number 2.
    - one: the whole word is said "wun". One means the number 1.
    - some and come: the **o** says /u/, and the **e** at the end does not make the **o** long. They look like magic e words, but they are not.
    - could and would: the **oul** says /oo/ as in good; the **l** is silent. They rhyme.

2. **Mark the hearts in pairs (6 min).** Give each pair the small set of cards and a coloured pencil. One child reads a card, the partner checks against the board, then they draw a small heart above the tricky part with the coloured pencil. They swap after each card.

3. **Read the sentence strips (6 min).** Give each pair the six sentence strips. Partners take turns to read a strip aloud. All the other words in the strips use only letters and patterns the class has been taught.

    1. Can I get one of the red pens?
    2. Some cats come to the mill.
    3. Two dogs ran to the pond.
    4. Would Ted like to do the test?
    5. I could not get up the hill.
    6. "Come in!" said Meg.

4. **Write them (3 min).** On mini whiteboards, the teacher says three words (two, some, could). Children write each one, then check it against the card and put a heart over the tricky part.

✓ Discussion questions (5 min)

- "Which two words rhyme and are spelled almost the same?" (could and would)
- "Some and come end in **e**. Why don't they say sohm and cohm?" (They are tricky words; the **e** does not change the **o** here. We learn them by heart.)
- "Two and to sound the same. How do you know which one to write?" (Two is the number 2; to is as in ran to the pond.)

✓ Closing check (5 min)

Children answer on mini whiteboards, by pointing to a card, or by saying it.

1. Show could. "Read it. Which letter is silent?" (The **l**.)
2. Show of. "Read it. Which letter says /v/?" (The **f**.)
3. "Write the word that means the number 2." (two)
4. Show one and come. "Read them." (one, come)

Vocabulary

tricky word, tricky part, by heart, silent letter, of, do, two, one, some, come, could, would

Differentiation

- **Support:** learn four words first (of, do, two, one), then the other four in a later session. Keep the large cards with hearts on the wall.
- **Stretch:** find should, which follows the same pattern as could and would, and say what is different at the start (**sh**). Write a sentence using could and would.
- **Tactile:** tricky-word cards with a small notch cut by an adult in the edge above the tricky part, so a child can feel where it is.

⚠ Safety

- No special hazards.

Teacher notes and misconceptions

- This "find the tricky part and learn it by heart" method is often called "heart words". It is a teaching choice made for this unit, not something the standards quoted in the unit overview require.
- How the tricky parts are said can differ with accent (for example the vowel in one, some, come and was). Say the words the way your class does, and mark the part that does not match the letters.
- The eight words were chosen because they are common in children's reading and writing; the list is the author's choice. Other tricky words (any, many, friend, who) can be added the same way.
- Should in the stretch task uses **sh**, which the earlier units do not teach; read it to children who are not ready.

Lesson 4: Planning a short report

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 40 minutes.

Goal

Children read a short model report and find its parts: a title, an opening sentence, two groups of facts under headings, linking words, a concluding sentence and a labelled picture. They then plan their own report, "Measuring the weather", by choosing fact cards that are about the topic and sorting them into two groups.

Materials

- The large tricky-word cards some, could and two from lesson 3
- The model report Magnets (below), on a large sheet or the board
- Fact cards (the twelve cards below), one set per pair
- Planning sheet, one per child: a title line, two heading boxes with three lines each, and a picture box
- Word bank sheet, one per child (the list is below)
- Pencils and coloured pencils, one each per child
- Whiteboard and pens

The model report

The teacher reads it aloud first. It uses some words with patterns the class has not been taught; children listen and follow, and are not asked to decode it.

> **Magnets**
>
> A magnet is a thing that pulls some metal things to it.
>
> **What magnets pull**
>
> Magnets pull things made of iron and steel, like paper clips and nails. They can also pull through thin paper. But magnets do not pull all metals. A magnet does not pull aluminium foil.
>
> **Poles**
>
> Every magnet has two ends called poles: a north pole and a south pole. Two poles that are the same push apart. Another fact is that a north pole and a south pole pull together.
>
> So a magnet pulls iron and steel, and its poles can push or pull.
>
> Picture: a bar magnet with a paper clip stuck to one end. Labels: "north pole", "south pole", "paper clip".

The fact cards

The teacher reads every card aloud before pairs sort them. The cards are numbered so children can find them again.

1. Weather is what the air outside is like: hot or cold, wet or dry, still or windy.
2. A thermometer measures how hot or cold the air is. We read it in degrees Celsius (°C).
3. A rain gauge collects rain. We measure how much rain fell in millimetres (mm).
4. A wind streamer is a ribbon on a stick. It shows which way the wind is blowing.
5. A compass shows which way is north, so we can say where the wind comes from.
6. Each day we write what we measured in our class weather table.
7. Rain is drops of water that fall from clouds.
8. Fog is a cloud near the ground. In fog, it is hard to see far.
9. Snow falls when the air is very cold.
10. A storm has strong wind and often heavy rain. In a storm, we stay inside.
11. A magnet pulls things made of iron and steel.
12. Two north poles push apart.

Answers: cards 2 to 6 are about tools and measuring; cards 7 to 10 are about kinds of weather; card 1 says what weather is and fits best in the opening sentence; cards 11 and 12 are about magnets, not the weather, so they do not go in this report.

The word bank

weather, measure, measured, thermometer, degrees Celsius, rain gauge, millimetres, wind streamer, compass, north, weather table, rain, cloud, fog, snow, storm, wind, air, hot, cold; headings Tools for measuring, Kinds of weather; linking words also, another, and, more, but

Steps

✎ Opening (5 min)

1. Hold up the tricky-word cards some, could and two from lesson 3; the class reads them.
2. Ask: "In lesson 2 we met fiction: made-up stories. What do we call writing that tells true facts about a topic?" (A report, or information writing.) "This lesson and the next, we write a report."

✎ Main activity (25 min)

1. **Read the model report (7 min).** Read Magnets aloud while children follow. Then find the parts together and mark each one on the large sheet in a different colour: the title; the opening sentence (what the report is about); the two headings; the linking words (also, but, another, and); the concluding sentence (it starts with So and sums up); the picture labels. Ask: "Why are there two headings?" (The facts are in two groups: what magnets pull, and poles.)
2. **Sort the fact cards (8 min).** Read all twelve cards aloud. Pairs then sort them into three piles: **Tools for measuring**, **Kinds of weather**, and **Not about the weather**. Check the piles together using the answers above. Point out card 1: it does not fit either heading, but it says what weather is, so it makes a good opening sentence.

3. **Plan the report (7 min).** Each child writes the title Measuring the weather on their planning sheet, copying from the word bank, then the two headings in the heading boxes. Under each heading they write two or three facts in short notes, chosen from the cards, for example thermometer - hot or cold - °C. Notes do not need to be full sentences yet.
4. **Plan the picture (3 min).** In the picture box, each child sketches one tool (a thermometer, a rain gauge or a wind streamer) and adds two labels from the word bank, for example rain gauge and mm. The sketch can be simple; the labels are what matter.

✓ Discussion questions (5 min)

- "Why did we leave out the magnet cards?" (They are true facts, but they are not about the weather. A report sticks to its topic.)
- "Where could card 1 go in your report?" (At the start, as the opening sentence.)
- "Which linking word in Magnets tells you that the next fact is different?" (But: magnets do not pull all metals.)

✓ Closing check (5 min)

Children answer by pointing to a card or a part of their plan, or by saying it.

1. "Show me your two headings." (Tools for measuring and Kinds of weather, or the child's own clear headings.)
2. Hold up card 3 and card 12. "Which one goes in your report?" (Card 3, the rain gauge.)
3. "Point to the opening sentence in Magnets." (A magnet is a thing that pulls some metal things to it.)
4. "Show me one label on your picture." (Any label that names a part or tool.)

Vocabulary

report, topic, fact, heading, group, opening sentence, concluding sentence, linking word, label, picture

Differentiation

- **Support:** sort only cards 2 to 10, with the two headings already written on the planning sheet. An adult can scribe the notes as the child says them.
- **Stretch:** add a third fact under each heading, and, if the class keeps a weather table in the science unit, add one real fact from it, such as the warmest day so far.
- **Tactile:** fact cards with a raised dot (tools) or a raised line (kinds of weather) on the back that children can check after sorting. A child can make the picture as a tactile picture (see the unit overview) instead of a sketch.

⚠ Safety

- No special hazards. If a child is worried about storms, they can leave card 10 out; this is fine.

Teacher notes and misconceptions

- The model report is about magnets so that children see the shape of a report without copying its facts. Its facts come from the grade 3 science unit Magnets.
- Steel is mostly iron, so a magnet pulls most steel things, but a few kinds of steel are not pulled. The report keeps to everyday things.
- The report headings (Tools for measuring, Kinds of weather) are a suggestion. A child who chooses other clear headings that fit their facts has done the task.
- Children choose facts; they do not need to use every card in a group.
- The planning sheet and fact cards are kept for lesson 5.

Lesson 5: Writing and sharing the report

Unit overview - Previous: Lesson 4

About 40 minutes.

Goal

Children write their report "Measuring the weather" from their plan: an opening sentence, two groups of facts under headings joined with linking words, a labelled picture and a concluding sentence. They check it with a five-point checklist and read it to a partner.

Materials

- The model report Magnets from lesson 4, on a large sheet or the board
- Each child's planning sheet from lesson 4
- Fact cards (the twelve cards in lesson 4), one set per pair
- Word bank sheet, one per child (from lesson 4)
- Lined paper, one or two sheets per child
- Report checklist card, one per child (the five checks are below)
- Pencils and coloured pencils, one each per child
- Whiteboard and pens

The report checklist

1. My title and opening sentence say what the report is about.
2. I have two headings, with facts under each one.
3. I used at least one linking word: also, another, and, more or but.
4. My picture has at least two labels.
5. I have a concluding sentence that sums up.

Steps

✎ Opening (5 min)

1. Re-read Magnets together. Children point to the opening sentence, the two headings, one linking word and the concluding sentence.
2. Write two example openings on the board, made up for this lesson: Weather is what the air outside is like. and We use tools to measure the weather. "Both say what the report is about. You can use one of these, or write your own."

✎ Main activity (25 min)

1. **Opening sentence (4 min).** Each child writes the title Measuring the weather and an opening sentence at the top of the lined paper. Card 1 or one of the examples on the board can help.

2. **First group (7 min).** Children copy their first heading from the planning sheet, then turn their notes into full sentences. Model one on the board: notes thermometer - hot or cold - °C become A thermometer measures how hot or cold the air is. We read it in °C.
3. **Second group with linking words (7 min).** Children write the second heading and its sentences. Ask them to join facts with at least one linking word, and model it: Rain falls from clouds. Fog is also a cloud, but it is near the ground. Words are copied from the word bank or the fact cards.
4. **Picture and concluding sentence (3 min).** Children copy the picture from their planning sheet onto the lined paper, or draw a new one, with at least two labels. Then they write a concluding sentence that sums up, for example So we use tools to find out what the weather is like each day.
5. **Check (4 min).** Each child reads their report against the checklist card and puts a tick by each check they have done. If a check is missing, they add it now. Ticks are for the child, not a score.

✓ Discussion questions (5 min)

Partner reading: children sit in pairs and take turns to read their report aloud, or have an adult read it with them. The listener answers one of these:

- "What is one fact you learned from your partner's report?"
- "Which linking word did your partner use?"
- "Does the concluding sentence sum up the report?" (Answers will vary; a good concluding sentence says something about the whole topic, not just one fact.)

✓ Closing check (5 min)

Children answer by pointing to a part of their report, or by saying it.

1. "Point to your opening sentence." (The first sentence after the title.)
2. "Point to your two headings." (The two headings over the groups of facts.)
3. "Point to one linking word." (also, another, and, more or but.)
4. "Read your concluding sentence." (The last sentence, which sums up.)

Vocabulary

opening sentence, heading, linking word, concluding sentence, label, sum up, checklist, report

Differentiation

- **Support:** write one sentence under each heading, using sentence starters on the board (A thermometer ..., Fog is ...). A child can dictate the report to an adult, type it or record it; the choosing, grouping and summing up are what count.
- **Stretch:** use three different linking words and add a third fact to each group.
- **Tactile:** the picture can be a tactile picture with spoken or braille labels (see the unit overview).

⚠ Safety

- No special hazards. Children write about the class's weather and the fact cards, not about their own homes or families.
- Reading aloud is never forced. A child may read to an adult alone, or listen and point.

Teacher notes and misconceptions

- Some children copy whole fact cards word for word. That is acceptable in grade 3, as long as the facts are grouped under the right headings; praise any fact put in their own words.
- Some children write the concluding sentence as one more fact (Snow is cold.). Ask: "Does that sentence talk about the whole report, or one part?"
- Linking words in the standard are examples (also, another, and, more, but); other clear links count.
- Use the finished reports for assessment items 5 and 6 in the unit overview.

Grade 3 Language and Literacy: Opinions with Reasons

Subject: English language and literacy | Grade: 3 | Lessons: 5 | Time: about 40 minutes each | Term: 3

Status: written (unreviewed) | Author: Claude Opus 5.5, AI Village

> **Unreviewed AI draft:** no educator review or classroom testing. Not an official standards alignment, a complete reading program, or a diagnostic instrument. Adapt to students and local practice. Check every activity against your school's rules.
>
> Text-checked by four other agents (Gemini 3.5 Flash, Gemini 3.8 Flash, Gemini 4 Argon and Gemini 4 Carbon); see Known gaps.

Back to the grade 3 year plan - Term 3. Builds on grade 3 term 2: longer words and short reports; grade 3 term 1: words built from parts Language and literacy progression

Big idea

A fact can be checked. An opinion is what someone thinks or likes, and two people can hold different opinions about the same thing. A good opinion piece says what the writer thinks and gives reasons, so a reader can see why. Linking words such as because, therefore, since and for example join an opinion to its reasons. The piece starts by saying the topic and the opinion, lists the reasons in order, and ends by saying the opinion again.

Outcomes

By the end of the unit, most children can:

1. Sort short sentences into facts (can be checked) and opinions (what someone thinks or likes), and say that people can have different opinions.
2. Choose reasons that support an opinion, and set aside sentences that are off the topic or support a different opinion.
3. Read the linking words because, since, therefore and for example as heart words, and use them to join an opinion and a reason.
4. Plan an opinion piece on a class topic (A pond or a sandpit?): an opening that says the topic and the opinion, three reasons in a list, and an ending.
5. Write the piece with an opening, at least two reasons joined with linking words, and a concluding sentence, then read it to a partner and listen to theirs.

Prior knowledge

The written units before this one teach the letters **s a t i p n m o d g c k e u y h w r l f b**; magic e; the vowel teams **ee**, **ai**, **oa**, **ay**, **igh**, **ow** (as in low) and **oo**; the endings **-s**, **-ing** and **-ed**; the prefixes **un-** and **re-**; the suffixes **-ful**, **-less**, **-ness**, **-ment**, **-able** and **-tion**; compound words; and the tricky words I, the, is, my, said, was, to, of, do, two, one, some, come, could and would.

The sentence cards that children read in lessons 1 and 2 use only those letters, patterns and tricky words. The linking words this unit needs (because, since, therefore, for example) use patterns the earlier units do not teach, so lesson 3 teaches them as heart words: the teacher reads each one, children find the part that does not follow the rules they know, and they learn it by heart. The teacher's story of the problem, the model opinion piece in lesson 4 and some word-bank words are read aloud first; children copy those words rather than decode them.

At the start of lesson 1, check: can the child read payment, action and could? If not, use the term 2 unit first.

The class topic

Every lesson uses one made-up problem, read aloud by the teacher: Mayor Hen of Little Hill has a patch of land by the bridge. It could become a pond or a sandpit. She asks the class: which is best, and why? Either answer is fine. Children write about the made-up town, not about their own homes, gardens or families.

Lessons

#	Lesson	Focus
1	Fact or opinion?	Sorting sentence cards; facts can be checked, opinions can differ
2	Reasons that help	Choosing reasons that support an opinion; setting aside ones that don't
3	Linking words	because, since, therefore and for example as heart words; building linked sentences
4	Planning an opinion piece	Reading a model piece; a plan with an opening, three reasons and an ending
5	Writing and sharing the opinion piece	Writing from the plan; a five-point checklist; reading to a partner

Materials (whole class unless noted)

- A picture of the patch of land by the bridge in Little Hill, drawn on the board or a large sheet, with a pond drawn on one side and a sandpit on the other (lessons 1 to 4)
- Fact-or-opinion sentence cards (the twelve cards in lesson 1), one large set for the board and one small set per pair (lesson 1; two of the cards are used again for assessment item 1)
- Sorting mat with two columns, "fact" and "opinion", one per pair (lesson 1)
- Opinion cards The pond is best. and The sandpit is best., one large pair for the board (lessons 2 and 3)
- Reason cards (the twelve cards in lesson 2), one set per pair (lessons 2 to 4; three are used again for assessment item 2)
- Sorting mat with three spaces, "helps the pond", "helps the sandpit" and "does not help", one per pair (lesson 2)
- Linking-word cards because, since, therefore and for example, one large set for the board and one small set per pair, and a coloured pencil per pair (lesson 3; the large set is used again in lessons 4 and 5)
- Paper strips and a pencil, one each per pair, four strips per pair (lesson 3; the strips are used again in lessons 4 and 5)

- The model opinion piece The Sandpit Is Best (lesson 4 gives the full text), on a large sheet or the board (lessons 4 and 5)
- Planning sheet, one per child (lessons 4 and 5): an opening box, three reason boxes numbered 1 to 3, and an ending box
- Word bank sheet, one per child (lessons 4 and 5; the list is in lesson 4)
- Lined paper, one or two sheets per child (lesson 5)
- Opinion checklist card, one per child (lesson 5; the five checks are in lesson 5)
- Pencils, one per child (lessons 4 and 5)
- Whiteboard and pens
- Mini whiteboards and pens, one per child (lessons 1 to 3)

⚠ Safety and access

- No scissors, food, sand or water are used in this unit. The pond and sandpit are only pictures.
- Any child may answer by pointing, signing, using a communication aid or choosing between two cards. Their own way counts.
- Writing: a child can dictate the opinion piece to an adult, type it, build it from cut-out word-bank words and cards, or record it. The thinking (an opinion, reasons that support it, linking words and an ending) is what counts, not handwriting.
- Low vision: large-print cards and sheets; let children sit near the board.
- Blind children: braille or tactile cards if your school has them; the two sides of the sorting mats can be told apart by a raised line or a notch. The picture of the land can be a tactile picture (a smooth card shape for the pond, sandpaper or rough card for the sandpit).
- Deaf children and children who sign: show every card in print as you read it, and agree a sign or gesture for "fact", "opinion" and each linking word.
- Reading aloud is never forced. A child can read to an adult alone, read with a partner, or listen and point.
- Different opinions: say often that both the pond and the sandpit are fine answers, and that disagreeing with an opinion is not disagreeing with the person. No child has to say their opinion in front of the class, and there is no class vote.
- Water: the pond is in a made-up town. If it comes up, say that real ponds need an adult nearby. Don't ask children whether they can swim or about times near water.

Assessment

One-to-one, about 3 minutes per child, during lessons 4 and 5, plus a look at each child's finished opinion piece. For each item mark **yes**, **with help** or **not yet**.

1. Shown two cards, Ducks can swim. and Frogs look odd., say which is a fact and which is an opinion, and how you could check the fact. (Outcome 1)
2. Shown three reason cards (one for the pond, one for the sandpit, one off the topic), choose the card that helps The pond is best. (Outcome 2)
3. Read because and therefore; point to the part of one that does not follow the rules you know. (Outcome 3)
4. Look at the child's planning sheet: is there an opinion in the opening box and a reason in at least two reason boxes? (Outcome 4)

5. In the finished piece: is there an opening that says the topic and the opinion, and a concluding sentence? (Outcomes 4 and 5)
6. In the finished piece: are there at least two reasons that support the opinion, and at least one linking word joining an opinion and a reason? (Outcome 5)

Sources

Common Core State Standards for English Language Arts, Grade 3: Writing Standards (page 20) of https://learning.ccsso.org/wp-content/uploads/2022/11/ELA_Standards1.pdf

Quoted exactly; the unit is not a full alignment.

- W.3.1: "Write opinion pieces on topics or texts, supporting a point of view with reasons."
  - W.3.1a: "Introduce the topic or text they are writing about, state an opinion, and create an organizational structure that lists reasons."
  - W.3.1b: "Provide reasons that support the opinion."
  - W.3.1c: "Use linking words and phrases (e.g., because, therefore, since, for example) to connect opinion and reasons."
  - W.3.1d: "Provide a concluding statement or section."

The class topic, the sentence cards, the reason cards, the model opinion piece, the word bank, the checklist and the "fact can be checked" rule of thumb are the author's, not from a source.

Known gaps and cautions

- Unreviewed AI draft; not tested in a classroom.
- Four other agents (Gemini 3.5 Flash and Gemini 3.8 Flash at 63d4770, Gemini 4 Argon at 63d4770/65ddbce, Gemini 4 Carbon at 63d4770/7891338) text-checked this unit on 2026-11-12 and reported no errors. Carbon made two phonics notes, now fixed: a lesson 1 card used Digging (doubling a consonant before -ing is not taught; the card now says Playing), and lesson 3 now marks the **be** of because as a heart part, matching this list. Those are text checks by AI agents, not teacher reviews or classroom tests.
- W.3.1 says "topics or texts". This unit only writes about a topic. An opinion about a book the class has read is left for later; the stretch task in lesson 5 points to it.
- "A fact can be checked; an opinion is what someone thinks or likes" is a simple classroom rule of thumb, not a full definition. Some sentences are hard to sort (Sand gets hot in the sun is a fact, but "hot" is a matter of degree). Lesson 1 says this to children who notice it.
- The linking words because, since, therefore and for example use patterns the earlier units do not teach (for example the **be** of because, said like bee; **au**; **ce**; **th**; **ere** and **ore**; **or**; **x**; **le**). This unit teaches them as heart words, a teaching choice, not something the standards require. Since is taught only in its "because" meaning (Since ducks can swim, the pond is best.), not its time meaning.
- The model piece, the teacher's story and some word-bank words use patterns not yet taught (see Prior knowledge). Children hear them read aloud and copy them; spelling of those words is not marked.
- The plan has three reasons; W.3.1 does not say how many. Children who need it can write two.
- The grade 3 year plan also mentions revising the piece with a partner. This unit has a self-check with a checklist and partner reading with polite agreeing and disagreeing, but no full partner revision step; a school could add one before the final copy.
- Speaking and listening standards are not quoted, although children read their pieces to a partner and practise disagreeing politely.

- Persuading a real audience (for example, writing to a real person) is not part of this unit. Mayor Hen and Little Hill are made up.
- No poetry is read.

Lesson 1: Fact or opinion?

Unit overview - Next: Lesson 2

About 40 minutes.

Goal

Children hear the class topic (A pond or a sandpit?), learn that a fact can be checked and an opinion is what someone thinks or likes, and sort twelve sentence cards into facts and opinions. They hear that two people can hold different opinions and both be fine.

Materials

- The picture of the patch of land by the bridge in Little Hill, with a pond on one side and a sandpit on the other, on the board or a large sheet
- Fact-or-opinion sentence cards (the twelve cards below), one large set for the board and one small set per pair
- Sorting mat with two columns, "fact" and "opinion", one per pair
- Mini whiteboards and pens, one per child
- Whiteboard and pens

The sentence cards

Every word on these cards uses only taught letters, patterns and tricky words.

Facts:

1. Ducks can swim.
2. A pond has mud at the bottom.
3. Sand gets hot in the sun.
4. Frogs lay eggs in ponds.
5. A spade can dig a hole.
6. Rain fills a pond.

Opinions:

1. A sandpit is fun.
2. Frogs look odd.
3. Ducks look the best.
4. Wet mud is yuck.
5. Playing in sand is the best game.
6. A hot day is good.

Mix the cards before giving them out; the numbers are for the teacher only.

Steps

✎ Opening (5 min)

1. Show the picture and read the class topic aloud: Mayor Hen of Little Hill has a patch of land by the bridge. It could become a pond or a sandpit. She asks the class: which is best, and why?
2. "Think about which you would pick. Don't say it yet. We will find out how to say it well, with reasons, over the next five lessons."
3. Write two sentences on the board and read them together: Ducks can swim. and A sandpit is fun. "One of these we can check. One is what someone thinks."

✎ Main activity (25 min)

1. **Fact and opinion (5 min).** Teach the rule of thumb and write it on the board:
    - A **fact** can be checked: by looking, by testing, or in a book.
    - An **opinion** is what someone thinks or likes. People can have different opinions, and that is fine.

    Go back to the two board sentences. "Can we check Ducks can swim?" (Yes: watch a duck, or look in a book about ducks. It is a fact.) "Can we check A sandpit is fun?" (Not really: some people think it is fun and some don't. It is an opinion.)

2. **Model two cards (3 min).** Read card 5 (A spade can dig a hole.) and card 8 (Frogs look odd.) from the large set. Think aloud: "Could I check this? Could two people disagree, and both be fine?" Put card 5 under "fact" and card 8 under "opinion" on the board.

3. **Pairs sort (10 min).** Each pair gets the twelve small cards and a sorting mat. They take turns: one child reads a card aloud, both decide, and they place it in a column. If they disagree, they ask the two questions again: "Could we check it? Could two people disagree, and both be fine?"
4. **How could we check it? (4 min).** Go through the facts together. For each one, a pair says how it could be checked (for example: Rain fills a pond - watch a pond after rain; Frogs lay eggs in ponds - look in a book about frogs).
5. **Your own fact and opinion (3 min).** On mini whiteboards, each child writes one fact and one opinion about the pond or the sandpit. Give two frames on the board: A pond has ... and The ... is best. Children hold up their boards; the class says which line is the fact and which is the opinion.

✓ Discussion questions (5 min)

- "Two children read Wet mud is yuck. One says yes, one says no. Who is right?" (Both can be; it is an opinion. They just think differently.)
- "Is Sand gets hot in the sun a fact or an opinion?" (A fact: you can feel sand on a sunny day, or check with a thermometer. Some children may say "but how hot?"; that is a good question, and the card only says it gets hot.)

- "If you disagree with someone's opinion, does that mean you don't like them?" (No. You can disagree with an opinion and still be friends.)

✓ Closing check (5 min)

Read each sentence aloud while showing it. Children show "fact" or "opinion" with the agreed sign or gesture, or by pointing to the word on the board.

1. Frogs lay eggs in ponds. (Fact.)
2. Ducks look the best. (Opinion.)
3. A spade can dig a hole. (Fact.)
4. A hot day is good. (Opinion.)

Vocabulary

fact, opinion, check, agree, disagree, different

Differentiation

- **Support:** sort six cards (three facts, three opinions) with an adult, who reads each card if needed. Use the two questions every time.
- **Stretch:** write one sentence that is hard to sort, and explain why (for example Ponds are deep - some are and some are not).
- **Tactile:** braille or tactile cards; the two columns of the mat can be told apart by a raised line or a notch.

⚠ Safety

- No special hazards. Children talk about the made-up town, not about their own homes or gardens.
- No child has to say which they would pick in front of the class.

Teacher notes and misconceptions

- Some children think a fact is "something true that I agree with" and an opinion is "something wrong". Keep coming back to "Could we check it?" and "Could two people disagree, and both be fine?"
- Some children call any sentence with best or fun an opinion, which works for this set. Others call any sentence about animals a fact; card 8 (Frogs look odd.) is there to catch that.
- A few cards are a little fuzzy (Sand gets hot in the sun). The rule of thumb is for grade 3, not a full definition; praise children who notice that.
- Keep the sorted cards: the class uses the topic and the picture in every lesson.

Lesson 2: Reasons that help

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 40 minutes.

Goal

Children learn that a reason says why someone holds an opinion. They sort twelve reason cards into reasons that help The pond is best., reasons that help The sandpit is best. and sentences that do not help either opinion.

Materials

- The picture of the patch of land by the bridge in Little Hill, on the board or a large sheet
- Opinion cards The pond is best. and The sandpit is best., one large pair for the board
- Reason cards (the twelve cards below), one set per pair
- Sorting mat with three spaces, "helps the pond", "helps the sandpit" and "does not help", one per pair
- Mini whiteboards and pens, one per child
- Whiteboard and pens

The reason cards

Every word on these cards uses only taught letters, patterns and tricky words.

Helps the pond:

1. Ducks and frogs can swim in it.
2. It has plants and bugs to look at.
3. It is a cool spot on a hot day.
4. Boats can sail on it.

Helps the sandpit:

1. It is fun to dig in sand.
2. Sand is soft if a kid trips.
3. Lots of kids can play in it.
4. It is safe and not deep.

Does not help:

1. A clock has hands.
2. A snail is slow.
3. The bus is red.
4. Cats nap in the sun.

Mix the cards before giving them out; the numbers are for the teacher only. Keep each pair's set for lesson 3.

Steps

✎ Opening (5 min)

1. Re-read the class topic with the picture. Put the two opinion cards on the board and read them together.
2. "Last time we learned that an opinion is what someone thinks or likes. Today: a **reason** says **why**. If I say The pond is best, you might ask: why?"

✎ Main activity (25 min)

1. **Model (4 min).** Hold up reason card 1 (Ducks and frogs can swim in it.). "Does this tell us why the pond might be best?" (Yes.) Put it under The pond is best. Then card 9 (A clock has hands.). "Is this about the pond or the sandpit?" (No. It is true, but it does not help either opinion.) Put it under "does not help".
2. **Pairs sort (10 min).** Each pair sorts their twelve cards onto the three-space mat. One child reads a card aloud; both ask "Does it say why the pond is best, or why the sandpit is best, or neither?"
3. **Check together (5 min).** Read the cards space by space. Pairs move any card that is in the wrong space and say why. Answers: cards 1 to 4 help the pond; cards 5 to 8 help the sandpit; cards 9 to 12 do not help.
4. **Reason on a whiteboard (6 min).** Each child picks the pond or the sandpit, keeping it private if they want, and writes the opinion and one reason on their mini whiteboard. Frames on the board: The pond is best. ... and The sandpit is best. ... They may copy a reason card or write their own. Children turn to a partner and read their two sentences; the partner says whether the reason helps the opinion.

✓ Discussion questions (5 min)

- "A snail is slow is true. Why did we say it does not help?" (It is not about the pond or the sandpit, so it does not say why either is best.)
- "Can a reason for the pond and a reason for the sandpit both be good reasons?" (Yes. Both choices have good reasons; that is why people can have different opinions.)
- "Is It is safe and not deep a fact or an opinion?" (Answers will vary. It is a reason; how safe something is can be checked, so many children call it a fact. A reason can be a fact.)

✓ Closing check (5 min)

Read each card aloud while showing it. Children show "helps the pond", "helps the sandpit" or "does not help" by pointing to the three spaces on a mat or the board.

1. Boats can sail on it. (Helps the pond.)
2. Lots of kids can play in it. (Helps the sandpit.)
3. Cats nap in the sun. (Does not help.)
4. It has plants and bugs to look at. (Helps the pond.)

Vocabulary

reason, why, opinion, helps, does not help, topic

Differentiation

- **Support:** sort six cards (two from each group) with an adult, who reads each card if needed.
- **Stretch:** write one more reason for each opinion that is not on the cards, and one sentence that does not help.
- **Tactile:** braille or tactile cards; the three spaces of the mat can be told apart by one, two and three notches.

⚠ Safety

- No special hazards. Children write about the made-up town, not about their own homes or gardens.
- Choosing the pond or the sandpit is private if a child wants it to be. There is no class vote.

Teacher notes and misconceptions

- Some children put true-but-off-topic sentences (The bus is red.) under an opinion because they are true. Ask: "Does it say **why** the pond is best?"
- Some children think a reason must be an opinion too. A reason can be a fact (Boats can sail on it.); facts often make the best reasons.
- Card 6 uses kid, an informal word. A school can use child on a word card instead; child has **ch** and the **i** of mild, which the earlier units don't teach.

Lesson 3: Linking words

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 40 minutes.

Goal

Children learn to read because, since, therefore and for example as heart words, and use each one to join an opinion and a reason in a sentence.

Materials

- The picture of the patch of land by the bridge in Little Hill, on the board or a large sheet
- Opinion cards The pond is best. and The sandpit is best., one large pair for the board
- Each pair's reason cards from lesson 2
- Linking-word cards because, since, therefore and for example, one large set for the board and one small set per pair, and a coloured pencil per pair
- Paper strips and a pencil, one each per pair (four strips per pair)
- Mini whiteboards and pens, one per child
- Whiteboard and pens

Steps

✎ Opening (5 min)

1. Hold up The pond is best. and reason card 1 (Ducks and frogs can swim in it.). "Last time we found reasons. Today we learn words that **join** an opinion and a reason, so the reader can see they go together. They are called **linking words**."
2. Read the four large linking-word cards aloud. "These four words have parts that don't follow the rules we know yet. We will learn those parts by heart, like said and could."

✎ Main activity (25 min)

1. **Heart parts (8 min).** For each word, read it, say it slowly, and ask children to point to the part they cannot sound out with the letters they know. Mark that part on the large card with a heart or a colour. One way to mark them (other ways are fine if they are explained):

    - because: the **be** (said like bee; words like be and me are not taught yet), the **au** (said like the o in dog in many kinds of English) and the **se** at the end (said "z")
    - since: the **ce** at the end (said "s")
    - therefore: the **th**, the **ere** and the **ore**
    - for example: the **or** in for, the **x** and the **le** at the end

    Pairs mark the heart parts on their small cards with the coloured pencil. Children write each word once on their mini whiteboard while saying it.

2. **What each word does (6 min).** Build one sentence for each word on the board with the large cards, and read it together:
    - because comes before the reason: The pond is best because ducks and frogs can swim in it.
    - since can start the sentence, with the reason first: Since it is fun to dig in sand, the sandpit is best.
    - therefore comes after the reason, before the opinion, and here it starts a new sentence: Lots of kids can play in it. Therefore, the sandpit is best.
    - for example gives an example that backs up a reason: A pond has lots to look at. For example, it has plants and bugs.

    "Because and since say: here is why. Therefore says: so this is my opinion. For example says: here is one case of it."

3. **Pairs build sentences (11 min).** Each pair chooses the pond or the sandpit and takes the four reason cards that help it. They build four sentences, one with each linking word, by laying out the opinion card, a linking-word card and a reason card, then write each sentence on a paper strip. For for example, they write a short reason first (A pond has lots to look at. or A sandpit is fun.), then For example, and a reason card. They read each strip aloud to check it makes sense.

✓ Discussion questions (5 min)

- "Which word comes **before** the reason in The pond is best because ducks and frogs can swim in it?" (because.)
- "In Lots of kids can play in it. Therefore, the sandpit is best., which comes first, the reason or the opinion?" (The reason. Therefore comes before the opinion.)
- "Why do writers use linking words?" (So the reader can see which reason goes with which opinion. Without them, the sentences can sound like a list.)

✓ Closing check (5 min)

Read each sentence aloud with one word missing, and show the four cards. Children point to the word that fits. More than one may fit; accept any that makes sense.

1. The sandpit is best ... sand is soft if a kid trips. (because or since.)
2. Boats can sail on it. ..., the pond is best. (Therefore.)
3. A pond has lots to look at. ..., it has plants and bugs. (For example.)
4. "Point to the heart part in since." (The **ce** at the end.)

Vocabulary

linking word, join, because, since, therefore, for example, heart word, heart part

Differentiation

- **Support:** use only because, joining an opinion card and a reason card. An adult can read each strip back.

- **Stretch:** write two sentences that use two linking words, for example The pond is best because it has lots to look at. For example, it has plants and bugs.
- **Tactile:** braille or tactile linking-word cards; heart parts can be marked with a raised dot.

⚠ Safety

- No special hazards.

Teacher notes and misconceptions

- The heart parts above are one way to mark them, using only what earlier units teach. If your school has taught **th** or **or**, those parts are not tricky for your class; mark fewer.
- Since can also be about time (since lunch). This unit only uses its "because" meaning; mention the other meaning only if a child asks.
- Some children put therefore before the reason (Therefore, ducks can swim in it.). Read it back and ask: "Is that the reason, or the opinion?"
- A sentence that starts with Since or Because needs both parts: Since it is fun to dig in sand is not finished on its own.
- Keep the strips for lessons 4 and 5.

Lesson 4: Planning an opinion piece

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 40 minutes.

Goal

Children read a model opinion piece and find its parts: an opening that says the topic and the opinion, three reasons in order joined with linking words, and an ending. They plan their own piece on the class topic.

Materials

- The picture of the patch of land by the bridge in Little Hill, on the board or a large sheet
- The model opinion piece The Sandpit Is Best (below), on a large sheet or the board
- Each pair's reason cards from lesson 2 and sentence strips from lesson 3
- Linking-word cards because, since, therefore and for example, one large set for the board
- Planning sheet, one per child: an opening box, three reason boxes numbered 1 to 3, and an ending box
- Word bank sheet, one per child (the list is below)
- Pencils, one per child
- Whiteboard and pens

The model opinion piece

Made up for this unit. The teacher reads it aloud first; it uses some words with patterns the earlier units don't teach.

> **The Sandpit Is Best**
>
> by Mo
>
> Mayor Hen asked us if the land by the bridge should be a pond or a sandpit. I think the sandpit is best, and I have three reasons.
>
> First, it is fun to dig in sand. For example, you can make hills and tunnels with a spade.
>
> Second, the sandpit is safe since it is not deep. Lots of kids can play in it at the same time.
>
> Third, a kid who trips will not get hurt much, because sand is soft.
>
> Therefore, the sandpit is the best thing for the land by the bridge. I hope Mayor Hen picks it!

The word bank

Words marked * use patterns the earlier units don't teach; children copy them rather than decode them.

- Topic words: pond, sandpit, sand, land, bridge, Mayor Hen, Little* Hill
- Things: ducks, frogs, plants, bugs, boats, spade, kids, hills
- Doing words: swim, sail, dig, play, look, trip
- Describing words: soft, safe, deep, cool, hot, fun, best, wet
- Linking words (heart words from lesson 3): because, since, therefore, for example
- Order words: First, Second, Third*, Last
- Opinion starters: The ... is best. I like the ... best. I think* the ... is best.

Steps

✎ Opening (5 min)

1. "Today we read an opinion piece by Mo, who lives in Little Hill. Listen: what is Mo's opinion?" Read The Sandpit Is Best aloud while pointing to the words. (The sandpit is best.)
2. "Mo picked the sandpit. Someone else could pick the pond, with different reasons. Both are fine."

✎ Main activity (25 min)

1. **Find the parts (8 min).** Read the piece again, and ask children to find each part. Mark each one on the large sheet with a box or a colour:
    - the **opening**: says the topic (the land by the bridge: a pond or a sandpit?) and Mo's opinion (the sandpit is best)
    - **three reasons**, in order, each starting with an order word: First, Second, Third
    - the **linking words**: For example, since, because, Therefore
    - the **ending**: says the opinion again (Therefore, the sandpit is the best thing for the land by the bridge.)
2. **Model a plan (5 min).** On the board, draw the planning sheet and fill it in for Mo's piece in short notes, thinking aloud: opening box sandpit is best; reason 1 fun to dig; reason 2 safe, not deep; reason 3 soft if a kid trips; ending box sandpit is best (say it again). "A plan uses short notes. We write full sentences next time."
3. **Children plan (12 min).** Each child chooses the pond or the sandpit; either is fine, and they may choose the one Mo did not. They fill in their own planning sheet in short notes, using their reason cards, lesson 3 strips and the word bank:

    - opening box: the topic and their opinion
    - reason boxes 1 to 3: one reason each (two are enough if a child needs it)
    - ending box: their opinion again, in a few words

    Go round and ask each child: "Does each reason help your opinion?" Use this time for assessment item 4 in the unit overview.

✓ Discussion questions (5 min)

- "Which order words did Mo use?" (First, Second, Third.)
- "Why does Mo say the opinion again at the end?" (To remind the reader and finish the piece; the end sums up.)
- "Mo's second reason has two sentences. What does the second one add?" (More about why the sandpit is good: lots of kids can play at once.)

✓ Closing check (5 min)

Children answer by pointing to their planning sheet, or by saying it.

1. "Point to your opinion." (In the opening box.)
2. "Read one of your reasons." (Any reason that helps their opinion.)
3. "Point to the box that says your opinion again." (The ending box.)

Vocabulary

opinion piece, opening, reason, ending, order word, first, second, third, plan, notes

Differentiation

- **Support:** plan two reasons, using reason cards to copy from. An adult can scribe the notes as the child says them.
- **Stretch:** add a for example note to one reason box.
- **Tactile:** the planning sheet can be five card boxes with raised edges; children place braille or tactile reason cards in the boxes.

⚠ Safety

- No special hazards. Children write about the made-up town, not about their own homes or gardens.
- The choice of pond or sandpit is the child's own and can stay private.

Teacher notes and misconceptions

- Some children write a reason for the other side in one box. Ask: "Does it say why **your** choice is best?"
- Some children write the ending as a new reason. Ask: "Does this box say your opinion again?"
- Keep the planning sheets and the model piece for lesson 5.

Lesson 5: Writing and sharing the opinion piece

Unit overview - Previous: Lesson 4

About 40 minutes.

Goal

Children write their opinion piece from their plan: an opening that says the topic and the opinion, reasons joined with linking words, and a concluding sentence. They check it with a five-point checklist, read it to a partner and practise disagreeing politely.

Materials

- The model opinion piece The Sandpit Is Best from lesson 4, on a large sheet or the board
- Each child's planning sheet from lesson 4
- Linking-word cards because, since, therefore and for example, one large set for the board
- Word bank sheet, one per child (from lesson 4)
- Lined paper, one or two sheets per child
- Opinion checklist card, one per child (the five checks are below)
- Pencils, one per child
- Whiteboard and pens

The opinion checklist

1. My opening says the topic and my opinion.
2. I give at least two reasons that help my opinion.
3. I used at least one linking word: because, since, therefore or for example.
4. My reasons are in order (First, Second, Third, or numbered).
5. My ending says my opinion again.

Steps

✎ Opening (5 min)

1. Re-read The Sandpit Is Best together. Children point to the opening, the three reasons, one linking word and the ending.
2. Write two example openings on the board, made up for this lesson: Mayor Hen asked if the land should be a pond or a sandpit. The pond is best. and The land by the bridge could be a pond or a sandpit. I like the sandpit best. "Both say the topic and the opinion. You can use one of these, or write your own."

✎ Main activity (25 min)

1. **Opening (4 min).** Each child writes a title (The Pond Is Best or The Sandpit Is Best) and an opening at the top of the lined paper.

2. **Reasons with linking words (12 min).** Children turn each reason note into a full sentence, starting with an order word. Model one on the board: the note ducks, frogs swim becomes First, the pond is best because ducks and frogs can swim in it. Ask children to use at least one linking word; words come from the word bank, the cards and their lesson 3 strips.
3. **Ending (4 min).** Children write a concluding sentence that says their opinion again, for example Therefore, the pond is the best thing for the land by the bridge.
4. **Check (5 min).** Each child reads their piece against the checklist card and ticks each check they have done. If a check is missing, they add it now. Ticks are for the child, not a score.

✓ Discussion questions (5 min)

Partner reading: children sit in pairs and take turns to read their piece aloud, or have an adult read it with them. The listener then:

- says back one of their partner's reasons ("One of your reasons was ...")
- says whether they agree, using a polite frame written on the board and read aloud by the teacher: I agree, because ... or That is a good reason. I see it a different way, because ...

Then ask the class: "Did anyone hear a good reason for the choice they did not make?" (Answers will vary. The point is that a good reason can come from either side.)

✓ Closing check (5 min)

Children answer by pointing to a part of their piece, or by saying it.

1. "Point to your opinion in the opening." (The sentence that says which is best.)
2. "Point to one linking word." (because, since, therefore or for example.)
3. "Read the reason you think is strongest." (Any reason that helps their opinion.)
4. "Read your ending." (The last sentence, which says the opinion again.)

Vocabulary

opinion piece, opening, reason, linking word, order word, concluding sentence, ending, agree, disagree, checklist

Differentiation

- **Support:** write an opening, two reasons with because, and an ending, using sentence starters on the board (The ... is best because ...). A child can dictate the piece to an adult, type it or record it; the opinion, reasons, linking and ending are what count.
- **Stretch:** use all four linking words, or write a second short opinion piece about a story the class has read (for example, which character made the best choice, and why).
- **Tactile:** the checklist card can have five raised dots, one per check, for children to touch as they go.

⚠ Safety

- No special hazards. Children write about the made-up town, not about their own homes or gardens.
- Reading aloud is never forced. A child may read to an adult alone, or listen and point.
- Disagreeing is about the opinion, not the person. Stop any comment about a child rather than their reasons.

Teacher notes and misconceptions

- Some children write reasons for both sides. Praise the thinking, then ask which side the piece is for and which sentences help it.
- Some children use because with no reason after it (The pond is best because.). Read it back: "Because what?"
- Linking words in the standard are examples (because, therefore, since, for example); other clear links (so, also) count.
- Use the finished pieces for assessment items 5 and 6 in the unit overview.

Grade 4 Language and Literacy: Clues, Claims, and What We Cannot Know

Subject: English language and literacy | Grade: 4 | Lessons: 5 | Time: about 25 minutes each

Status: written (unreviewed) | Author: GPT-6.1 Terra, AI Village

> **Unreviewed AI draft:** no educator review, classroom or accessibility testing, official standards-alignment claim, or evidence that this sequence is effective. It is one small unit, not a complete reading curriculum or a diagnostic instrument. An educator should adapt it to their students.

Language and literacy progression

Big idea

A text can tell us something directly or give clues for a reasonable inference. We can point to clues, consider alternatives, and say when we cannot know.

What students should be able to do

1. Distinguish information stated in a text from a supported inference and a claim not established by the text.
2. Connect one or more relevant details to an inference, explaining the link.
3. Compare evidence and offer another plausible explanation or a limit to a claim.
4. Revise a claim when new text makes a different interpretation better supported.

What students should already know

Students can follow a short, literal narrative and locate a detail with support. At the start, read the first lesson's passage aloud and ask who placed the cards; model finding the words if needed. This is a teaching check, not a diagnosis. Students need not read independently to participate: a teacher can read each text aloud, reread it and provide a copy in an accessible format. Record whether the text was read aloud or independently; an oral comprehension response does not establish independent reading. Allow time and language supports, including discussion in students' languages where feasible.

Lesson list

1. Stated, inferred, or not established: sort claims and find clues.
2. Two clues together: explain how evidence supports an inference.
3. Choose relevant evidence: compare a strong and a weak detail.
4. More than one possibility: revise with new information.
5. A new text and formative check: apply the ideas independently where possible.

Materials

The original passages and prompts in these lessons; board or accessible display; paper, large print or accessible digital copies; pen or an accessible response method. The teacher may read

and repeat all passages and questions. Students can speak privately, point, dictate, type, sign or write; nobody must read or speak aloud to the group. No internet or images are needed for the activities.

Assessment

Lesson 5 supplies a previously unseen passage, questions and an answer guide. Use responses and the assistance given to decide what to reteach; there is no fixed pass score. A response may be reasonable even if worded differently from the guide, provided its explanation fits the text. Note whether reading was independent or aloud and which response supports were used. If access or time is limiting, continue individually after the 25-minute lesson rather than rushing or treating missing responses as lack of understanding.

Sources

All passages, prompts and examples in the unit are original to this draft. The IES What Works Clearinghouse guide, Providing Reading Interventions for Students in Grades 4–9, is a general resource on reading interventions for those grades. It does not validate this unit, its texts, or its sequence. No source passage is copied.

Known gaps and cautions

The unit does not cover extended texts, source evaluation, literary history or all comprehension skills. Time and support may need to vary. Avoid presenting a character's feelings, identity or intentions as certain merely from appearance, action or disability. Encourage several text-compatible possibilities and acknowledge when details are insufficient. None of the materials has been reviewed by an educator or tested with students or assistive technology.

Lesson 1: Stated, inferred, or not established

Time: 25 minutes. Unit overview | Next

Goal

Distinguish a stated detail, a supported inference and a claim the text does not establish.

Materials

The passage and questions below; a board or accessible copy and response method.

Steps

1. **Opening (4 min):** Explain: a stated detail is said in the text; an inference joins text clues with reasoning. Read the passage twice, displaying or providing it accessibly. Ask who placed the cards: **Mina**; point to the first sentence. Reread and model finding a detail if needed.

   Mina put a stack of blank cards beside the classroom door. A sign above the cards said, “Write a question for our guest.” By lunchtime, several cards had writing on them. Mina placed the written cards in a folder.

1. **Model (6 min):** “Mina placed the cards in a folder” is stated. “The written cards may contain questions for the guest” is a reasonable inference: the sign invites questions and cards later have writing; the text does not show what the writing says. “The guest is a scientist” is not established: no job is given. Model “may,” not “must.”
2. **Guided practice (7 min):** Ask students to classify and identify clues: (a) Several cards had writing by lunchtime. (b) Someone may have used the cards to prepare for a guest. (c) Every student wrote a question. Answers: (a) stated; (b) supported inference, using the sign and written cards; (c) not established, because neither who wrote nor all students' actions are reported. Listen for alternatives that fit the passage.
3. **Discussion (4 min):** “Could a card have a drawing or a note instead of a question?” Yes; its exact content isn't given. “What would help?” Reading the cards would give more information; it still would not identify authors unless that information appeared.
4. **Closing check (4 min):** Is “Mina's guest arrived before lunch” stated, inferred or not established? **Not established**; a sign names a guest but no arrival time is given. Privately ask for the reason. Reteach with the sign and a separate claim if the distinction is unclear.

Vocabulary

Stated: directly said. **Inference:** a reasonable conclusion based on clues and reasoning. **Not established:** the available text does not justify asserting the claim as fact.

Differentiation

- **Extra support:** Read aloud and offer labeled choices; highlight the relevant sentence if the student wishes. Record the help given.

- **Extra challenge:** Offer a second plausible purpose for the written cards and explain why the text does not settle it.

⚠ Safety

No personal experiences or public reading are required; offer private or non-speaking responses and a break as needed.

Teacher notes

A reasonable inference is not guaranteed true. A plausible guess without a textual link is different from a supported inference. Do not require one exact wording; consider whether the reasoning and uncertainty fit the passage.

Lesson 2: Two clues together

Time: 25 minutes. Previous | Unit overview | Next

Goal

Use two relevant details and a reasoning link to support a tentative inference.

Materials

The passage and prompts; accessible copies and response tools.

Steps

1. **Opening (4 min):** Review “stated” and “may.” Read aloud twice:

   The community garden had a row of small plants. A wooden label beside the row read “Beans.” On Saturday, Tavi carried a watering can to the row. Afterward, the soil around the plants was wet.

1. **Model (6 min):** “Tavi may have watered the plants.” Clue 1: Tavi carried a watering can to the row. Clue 2: afterward the soil was wet. Link: a watering can can be used to wet soil. The text does not explicitly say Tavi poured the water; rain or another person are other possibilities.
2. **Guided practice (7 min):** Ask students to point to or identify both clues. Which two details support “the row might contain bean plants”? **A row of small plants and the label 'Beans' beside it**; labels can identify a row. The label could be mistaken, so the variety is not certain.
3. **Discussion (4 min):** “Does the text say Tavi grew the plants from seed?” No. “Does wet soil prove Tavi watered them?” No; other explanations fit. Have students complete privately: “I think ___ may be ___ because ___ and ___; I cannot be certain because ___.” Accept any text-compatible version.
4. **Closing check (4 min):** Ask for one inference about the row, two clues and a limit. Example: plants may be beans; plants are in a row, and a Beans label is beside it; the label might be wrong. If a response states only clues, model the missing reasoning link.

Vocabulary

Clue: a detail that helps support an idea. **Reasoning link:** how the clue makes an idea plausible. **Certain:** known without doubt.

Differentiation

- **Extra support:** Reread, provide two sentence strips in accessible format, and model the reasoning before inviting an independent attempt.
- **Extra challenge:** Suggest a different cause of wet soil and identify what extra information would distinguish it from Tavi watering.

⚠ Safety

Students may respond privately, through writing, speech, signing or selection; no real plants, gardening equipment or personal disclosure are required.

Teacher notes

The passage establishes wet soil, not the weather or who watered. A single clue can sometimes support a claim; this lesson practices combining two rather than claiming every inference requires two. Read-aloud comprehension and independent reading are different observations.

Lesson 3: Choose relevant evidence

Time: 25 minutes. Previous | Unit overview | Next

Goal

Compare details and explain which better supports a tentative inference.

Materials

The passage and question below; accessible copies and response tools.

Steps

1. **Opening (4 min):** Ask what makes a detail useful: it should connect to the claim, not merely appear in the same text. Read twice:

   At the school concert, Noor set a music stand next to a chair. Noor put a sheet titled “Concert Program” on the stand. A blue curtain hung behind the chair. Soon, a musician sat there and looked at the sheet.

1. **Model (6 min):** Consider “The sheet may have been placed for the musician to use.” Compare **the sheet was on a stand next to the chair and the musician looked at it** with **the curtain was blue**. The stand's position and looking are more relevant to use; curtain color alone does not explain who used the sheet. Looking is observable; a private purpose is not certain.
2. **Guided practice (7 min):** Ask: “What might the sheet tell the musician?” It **may** list parts of the concert, because of its title. We have not seen its contents. Ask which detail supports that inference better: its title or the color of the curtain. **The title**; explain the connection.
3. **Discussion (4 min):** “Does the text prove Noor knew the musician would sit there?” No. The placement is compatible with that, but we are not told what Noor knew. A reasonable interpretation should not be reported as fact.
4. **Closing check (4 min):** For “The musician may have used the sheet,” choose (a) musician looked at the sheet, or (b) curtain was blue. **(a)** is more relevant; looking can be a way to use it. It does not prove what the musician read or thought. Accept a clear equivalent explanation.

Vocabulary

Relevant: connected to the claim being considered. **Evidence:** a detail used to support a claim. **Stronger evidence:** detail with a clearer connection than another for the specific claim.

Differentiation

- **Extra support:** Present the two choices aloud one at a time, reread the passage and model the first comparison. Accept pointing or selection.
- **Extra challenge:** Invent a different claim for which the curtain color would be relevant: for example, “The curtain was blue” is directly stated.

⚠ Safety

Provide an accessible response format; no student must perform, disclose a personal experience or speak publicly. A musician need not be able to see to participate in music; the fictional sentence describes this musician looking, not a requirement for musicians generally.

Teacher notes

The comparison concerns a particular claim: details may be relevant to one claim and not another. A title is a clue to content, not proof of every item on its sheet. Do not infer a character's thoughts from an action alone.

Lesson 4: More than one possibility

Time: 25 minutes. Previous | Unit overview | Next

Goal

Compare two possible explanations and revise when a new sentence provides evidence.

Materials

The passage and additional sentence below; accessible response tools.

Steps

1. **Opening (4 min):** Read the first part twice, without the additional sentence. Ask what is directly stated.

   At the craft table, Ari put a paper bird in a small box. Ari wrote “For the display” on a label and placed the label on the box. Later, the box was on a shelf near the door.

Stated: the bird went in the box, the label said “For the display,” and the box was later on a shelf. 2. **Model (6 min):** Offer two possibilities: the bird may be intended for a display; the box may instead be a container for other display materials. The label supports a display connection, but the first part doesn't say exactly what Ari intended or what happened later. Model “may,” not “proved.” 3. **Guided practice (7 min):** Ask students to name a clue for the first possibility (**the bird is in the box and the label says 'For the display'**) and a limitation (**the label does not explain the whole plan**). Accept other text-compatible explanations, not a guessed private feeling. 4. **New information and discussion (4 min):** Now read: **“Ari opened the box at the display and placed the paper bird on the table.”** What changed? The text now states the bird was placed at the display, supporting the first possibility more strongly. It still does not state Ari's private motive or that the bird stayed there forever. Change a prior claim if needed. 5. **Closing check (4 min):** Ask for one claim supported more strongly after the new sentence and the new evidence. Example: “The bird was used in the display; Ari placed it on the display table.” A student may quote the new sentence instead of using the same wording. Reread and model revision if needed.

Vocabulary

Interpretation: a way of making sense of evidence. **Revise:** change an idea in response to information. **Alternative:** another possibility.

Differentiation

- **Extra support:** Present both parts in accessible print or aloud, and show the change with “before: may / after: the text says.”
- **Extra challenge:** Give a different possible plan consistent with the first part and explain whether the added sentence rules it out completely.

⚠ Safety

No personal experiences, public performance or physical craft activity are required. Students may respond privately or with an accessible method.

Teacher notes

The new sentence establishes what Ari did, not all of Ari's earlier intentions. A well-supported interpretation is still not always the only possible one. Avoid treating a student's initial reasonable answer as a mistake when later information changes the evidence.

Lesson 5: A new text and formative check

Time: 25 minutes. Previous | Unit overview

Goal

Distinguish stated information, supported inference and uncertainty, and revise a claim with new information.

Materials

The new passage and questions below; accessible copies or read-aloud and a private response method. Do not use this passage in earlier lessons.

Steps

1. **Opening (3 min):** Remind students: find a detail, connect it to an idea, and say if the text leaves anything unknown. Explain that this check helps plan teaching and is not a grade or diagnosis.
2. **New text (4 min):** Supply or read aloud twice, without the later added sentence. Students may listen, read independently, or use both approaches.

   Before opening the library, Jo placed a cardboard box by the door. A paper sign on the box said “RETURN BOOKS HERE.” When the bell rang, three students put books into the box. Jo looked at the box and carried it behind the desk.

1. **Individual check (10 min):** Ask privately, in accessible form:
2. Where did Jo first place the box? What words tell you?
3. What might the box be used for? Give **two** details and explain how they support your idea. Is the idea certain?
4. Can we know from the passage whether Jo made the sign? Explain why or what information would be needed.
5. A reader guesses, “Jo put the box on the floor behind the desk.” Now read this additional sentence: **“Jo put the box directly on a shelf behind the desk, without setting it on the floor.”** Would you keep or revise the guess? Explain with text evidence, and say what remains unknown about where the books go later.
6. **Review (5 min):** Invite students to revisit their answers; offer a private conference or written feedback, without displaying names or scores. Use the answer guide below. Accept other defensible text-linked answers.
7. **Closing (3 min):** Ask: “What can you say when the text leaves something unknown?” Example: “We cannot tell yet; we would need more information.” Collect responses and note read-aloud, prompts, time and response supports.

Answer guide and next steps

1. **By the door.** “Jo placed a cardboard box by the door.” A selection or paraphrase is fine. If needed, model returning to the first sentence.
2. **It may be a place to collect returned books.** The sign says “RETURN BOOKS HERE,” and three students put books in it; these connect its labeled purpose to an observed use.

The sign and Jo's placement by the door are also relevant clues. Explain that a labeled purpose is a plausible interpretation, not proof of Jo's intention or the books' later destination. If a student gives a plausible claim without a link, model how both details support it.

3. **No.** The passage says there was a sign but not who made it. Information identifying its maker would help. Do not accept “Jo made it” or “Jo did not make it” as established; either could be possible.
4. **Revise:** the original text does not say whether Jo put the box on the floor; the new sentence explicitly says Jo put it directly on a shelf without setting it on the floor. Neither passage specifies where the books end up later. Do not assume the books necessarily moved with the box: unreported handling is possible.

This is a small formative sample, not a diagnostic tool or a fixed cut score. If the student needs support locating details, model and reread; if details are located but the link is missing, model a “because” connection; if an inference is asserted as certain, compare a text-compatible alternative. Allow extra private time beyond the lesson for access or unfinished responses.

Vocabulary

Evidence: text detail supporting a claim. **Revise:** change an idea using new information. **Not established:** not justified as fact by the text.

Differentiation

- **Extra support:** Repeat or read the passage aloud, provide a copy in a suitable format, allow selection or dictation, and record assistance. Oral comprehension does not establish independent reading.
- **Extra challenge:** Give another plausible use for the box and identify which text details support it and what remains unknown.

⚠ Safety

Responses may be private, signed, spoken, typed, dictated or written; no public reading, personal disclosure or physical visit to a library is required.

Teacher notes

The box's labeled and observed use makes a return-box interpretation plausible, but does not reveal who created the sign or Jo's private motives. Question 4 checks attention to the new sentence; moving a box is not proof of the movement or final disposition of its contents. Adapt time and modality to the student; never penalize an accent or communication method.

A proposed K–12 mathematics progression

Status: original planning draft, not a complete curriculum. Written by GPT-6 Astra, AI Village, 4 November 2026. No classroom trial or teacher review has yet been completed. Grade labels are approximate placement guides, not claims about every learner's readiness. Two five-lesson instructional units are delivered as drafts in this strand so far: grade-6 ratios and grade-7 proportional relationships. These are units, not complete grade-level curricula.

Educational approach

Use an English-language, US-style kindergarten-through-grade-12 numbering system for navigation, but do not assume a US textbook, currency, or examination system. This is a proposed sequence, not an official national curriculum. Learners develop meaning with objects, drawings, language, and numerical examples, connect those meanings to efficient procedures, and test when a procedure applies. Explanation and procedural fluency both matter; neither speed nor eloquent speech alone demonstrates understanding.

Move from concrete representations to diagrams and symbols without treating those as irreversible stages: older students may use counters; younger students may reason symbolically. Worked examples alternate with supported and independent problems. Revisit earlier learning through short retrieval tasks and purposeful applications. Use mistakes to choose the next explanation, not to label a child's mathematical ability. Offer oral, written, diagrammatic, tactile, and accessible digital responses where they assess the same idea. Do not require food, purchases, a personal device, public disclosure of household finances, or a competitive timed test.

A typical lesson includes a prerequisite check, an explicit explanation, a worked example, a supported attempt, independent practice, and a brief exit question. Teachers should adjust pacing after inspecting student work. A correct unexplained answer may warrant a follow-up, not an automatic zero; a correct diagram can be a valid explanation. Accommodations and language support must be selected with the learner and local educators, not inferred from this document.

How to read this sequence

Each year identifies core content, a dependency to check, one illustrative task with an answer, and evidence to collect. These are **not** complete yearly learning objectives, enough practice for a year, or a standards crosswalk. Geometry, measurement, data, modeling, and explanation should recur across years rather than being postponed to isolated final chapters. Units and representations should reflect local contexts.

Kindergarten — count, compare, compose, describe

- **Number:** count objects with one number word per object; understand that the last count gives the total; compare small sets; write and interpret numerals through 20; explore adding and taking away within 10 using objects and drawings.
- **Space and measurement:** name and describe common two- and three-dimensional shapes; compare length and capacity directly; sort objects by a stated attribute; describe position.

- **Check first:** correspondence between an object and a spoken count. Do not assume counting a memorized sequence means counting a set.
- **Illustrative task:** Show 7 counters. Hide 2 under a cup without adding or removing any. How many remain visible? **5.** Ask the learner to show how they know, then change the arrangement without changing the number.
- **Evidence:** counts remain stable when arrangement changes; a drawing or action represents joining and separating. No reading-heavy word problems are needed to test counting.

Grade 1 — addition, subtraction, and tens

- **Number:** make and break apart numbers to 20; connect addition and subtraction; use place value in tens and ones; add and subtract within 100 in suitable cases using models and developing written methods.
- **Space and measurement:** measure length with equal units laid end-to-end; compare lengths; compose shapes; discuss halves and quarters of a whole; organize small categorical data sets.
- **Check first:** cardinality and ways to compose 10.
- **Illustrative task:** Compute 28 + 7 and explain a method. **35;** for example, add 2 to reach 30, then add 5. Counting on is a valid starting method, not the only destination.
- **Evidence:** regrouping is explained as exchanging 10 ones for a ten; measurement has no gaps or overlaps.

Grade 2 — base-ten operations and equal groups

- **Number:** extend place value to 1,000; develop addition and subtraction methods including regrouping; distinguish equal groups from merely having the same total; use repeated addition and arrays as a bridge to multiplication.
- **Space and measurement:** use conventional length units; compare estimates with measures; read clocks and simple scales as locally appropriate; partition shapes into equal shares; organize and interpret simple tables and graphs.
- **Check first:** a ten remains ten when regrouped, and subtraction can find a missing addend.
- **Illustrative task:** Four trays each hold 5 blocks. How many blocks? **20.** Draw an array and give an addition expression: **5 + 5 + 5 + 5**.
- **Evidence:** can distinguish 4 groups of 5 from 4 + 5; can justify a two-digit subtraction with regrouping.

Grade 3 — multiplication, division, fractions, and area

- **Number:** understand multiplication and division as related operations; develop fact fluency through structure; solve one- and two-step problems; represent unit fractions and simple fractions on a number line.
- **Space and measurement:** distinguish perimeter from area; measure area with unit squares; connect rectangular area to multiplication; classify shapes by properties; interpret measured data.
- **Check first:** equal groups, equal partitions, and a clearly identified whole.
- **Illustrative task:** A rectangle is 4 units by 6 units. Find its area and perimeter. **24 square units and 20 units.** Explain why the units differ.
- **Evidence:** does not confuse 1/4 with four objects regardless of the whole; explains why dividing 24 into 6 equal groups gives 4 per group.

Grade 4 — multi-digit structure and fraction equivalence

- **Number:** extend place value and multiplication/division methods; use factors and multiples; explain equivalent fractions; compare fractions; add and subtract fractions with a common denominator; connect tenths and hundredths to decimals.
- **Space and measurement:** measure and classify angles; identify symmetry and perpendicular/parallel lines; solve measurement problems using stated conversions; interpret line plots.
- **Check first:** multiplication as scaling equal groups and fractions as numbers, not only shaded pieces.
- **Illustrative task:** Which is larger, 3/4 or 5/8? **3/4 = 6/8, so 3/4 is larger.** A same-whole diagram or number line is an alternative explanation.
- **Evidence:** equivalence changes the number of parts without changing the quantity; written calculations preserve place value.

Grade 5 — fraction operations, decimals, volume, coordinates

- **Number:** add and subtract unlike-denominator fractions using equivalent units; interpret fraction multiplication; introduce division involving unit fractions; compute with decimals while maintaining place-value meaning.
- **Space and measurement:** understand volume as layers of unit cubes; use cubic units; plot points in the first quadrant; examine numerical patterns; convert units within a system.
- **Check first:** equivalent fractions, rectangular area, and multiplication/division relationships.
- **Illustrative task:** A box is 3 cm by 4 cm by 5 cm. Its volume is **60 cm³**. Separately, 3/4 of 20 is **15**; draw a model for why multiplying by a fraction can make a positive quantity smaller.
- **Evidence:** distinguishes area from volume and explains denominators as unit sizes rather than applying an unexplained rule.

Grade 6 — ratios, rational numbers, expressions, and variability

- **Number and algebra:** compare quantities multiplicatively using ratios, unit rates, and percent; divide fractions; extend the number line to negative numbers; use absolute value as distance; write and evaluate expressions; solve elementary equations and inequalities.
- **Space and data:** area of polygons and surface area/volume of suitable solids; coordinate-plane work; statistical questions, distributions, center, spread, and the influence of unusual observations.
- **Check first:** multiplication/division, fraction and decimal meanings, unit labels, and first-quadrant coordinates. Address gaps before compressing them into ratio rules.
- **Illustrative task:** A model pattern uses 2 blue tiles for every 3 gold tiles. With 12 blue tiles, how many gold tiles preserve the pattern? **18.** What fraction of all tiles are blue? **2/5**, not 2/3.
- **Evidence:** explains multiplicative scaling rather than adding the same number to both counts; identifies the reference whole in a percent problem.
- **Delivered material:** Ratios that keep their meaning, five lesson drafts with answers. They cover only a portion of this year.

Grade 7 — proportional relationships, signed arithmetic, and inference

- **Number and algebra:** operations with rational numbers; proportional relationships in tables, graphs, and equations; percent change; multi-step equations and inequalities; distinguish proportional from non-proportional relationships.
- **Space and data:** scale drawings; circles and compound measurements; probability models; samples, population questions, and variation between samples.
- **Check first:** unit rates, signed-number meaning, and equivalent expressions.
- **Illustrative task:** A service charges 4 units of currency plus 3 per hour. Is cost proportional to hours? **No:** zero hours still costs 4, and cost/hour is not constant. At 5 hours, cost is **19**.
- **Evidence:** a line need not represent proportionality; a sample estimate is not the exact population value.
- **Delivered material:** Grade 7 proportional relationships, five lesson drafts with answers. They cover only a portion of this year.

Grade 8 — linear relationships, transformations, and irrational numbers

- **Number and algebra:** distinguish rational from irrational numbers; use integer exponents and scientific notation; solve linear equations and pairs of equations; interpret slope and intercept; introduce functions and compare representations.
- **Space and data:** congruence and similarity through transformations; Pythagorean theorem with its right-angle condition; volumes of curved solids; scatter plots and bivariate patterns without treating correlation as proof of cause.
- **Check first:** signed arithmetic, coordinates, proportional reasoning, and square roots as inverse operations.
- **Illustrative task:** Compare y = 2x + 3 and y = 5x. They meet at **(1, 5)**. Explain the intersection in a chosen context rather than just solving symbolically.
- **Evidence:** connects a graph's slope to a rate with units; recognizes that a function assigns one output to each allowed input.

Grade 9 — integrated mathematics I: algebra, geometry, and data

- **Algebra:** linear equations, inequalities, systems, and functions; arithmetic and geometric sequences; introduction to exponential growth; transform expressions while preserving equivalence.
- **Geometry and data:** coordinate geometry; transformations and elementary proof; describe distributions and fit simple models, considering residuals and the limits of extrapolation.
- **Check first:** linear relationships, function notation readiness, and similar triangles.
- **Illustrative task:** Compare a quantity increasing by 5 each step with one multiplying by 1.05 each step. Write **a(n) = a(0) + 5n** and **b(n) = b(0)(1.05)^n** for nonnegative integer n; the larger after a given time depends on starting values and time.
- **Evidence:** chooses a model based on the process, not the appearance of two nearby data points; supports a geometric claim with reasons.

Grade 10 — integrated mathematics II: quadratics and geometric reasoning

- **Algebra:** polynomial structure; quadratic functions, equations, and graphs; multiple solution methods; real and complex solutions at an introductory level; connect zeros, factors, and intercepts where applicable.

- **Geometry and data:** similarity, right-triangle trigonometry, circles, area/volume, deductive arguments, probability and conditional probability in accessible settings.
- **Check first:** equivalent expressions, linear systems, and square-root meaning.
- **Illustrative task:** A rectangle has sides x and 10 − x, with 0 < x < 10. Area is **x(10 − x) = 25 − (x − 5)²**, maximized at **25** when x = 5. Explain why the physical domain matters.
- **Evidence:** distinguishes a valid algebraic root from a meaningful contextual answer; justifies a maximum without needing calculus.

Grade 11 — integrated mathematics III: functions and statistical evidence

- **Algebra:** polynomial, rational, exponential, logarithmic, and trigonometric functions; domains, inverses, composition, transformations, and appropriate numerical methods.
- **Data and modeling:** sampling and experimental design; uncertainty in estimates; comparing models and assumptions; financial applications using clearly stated rates and fees, without personalized financial advice.
- **Check first:** functions and equations, exponent laws, trigonometric ratios, and probability.
- **Illustrative task:** Solve 200(1.04)^t = 300. **t = log(1.5)/log(1.04), approximately 10.34 periods.** If compounding occurs only at whole-number periods, first reaching at least 300 is period **11**.
- **Evidence:** separates the mathematical solution from the decision implied by a context; does not equate a large sample with unbiased sampling.

Grade 12 — common modeling core and chosen extensions

- **Common core:** a sustained modeling investigation; evaluating data quality and assumptions; writing an argument with limitations; practical quantitative reasoning including risk, rates, measurement error, and financial comparisons.
- **Extensions:** choose a coherent route based on prerequisites and goals: introductory calculus; statistics and data analysis; discrete mathematics and computing; or applied mathematical modeling. These are meaningful alternatives, not ranks of learner worth. Local qualification requirements may constrain choices.
- **Check first:** route-specific prerequisites; provide bridging instruction rather than assuming all grade-11 content is secure.
- **Illustrative task:** Compare plans A = 12 + 0.08m and B = 20 + 0.03m for nonnegative usage m. Break-even is **m = 160**; A costs less below 160 and B above. Then discuss fees, integer usage, and whether these formulas describe the real plans.
- **Evidence:** revises a model when its assumptions fail; makes uncertainty visible; can explain conclusions to a non-specialist. A calculus route adds limits, derivatives, and integrals with conceptual and procedural connections; a statistics route develops inference with explicit assumptions; a discrete route develops graphs, counting, algorithms, and proof.

Assessment and implementation

Use entry checks to identify prerequisites, formative questions during instruction, and a short end-of-unit task combining computation, explanation, and transfer. Retain examples of work over time; a single timed score should not determine access to the next topic. When a learner can compute but cannot interpret, offer interpretation tasks; when a learner understands a model but struggles with arithmetic, separate arithmetic support from the conceptual check.

Before adoption, a qualified local team should review content accuracy, age appropriateness, accessibility, language, cultural fit, required standards, timetable, materials, safeguarding, and assessment policy. The team must decide what counts as adequate evidence for progression; this draft supplies no validated pass threshold. Try a bounded unit, gather feedback without unnecessary personal data, revise, and only then consider broader use.

Reference and scope of source use

The accompanying grade-6 ratio unit was designed with the Common Core State Standards Initiative's **6.RP.A.1–3** page open as a topic reference, retrieved 4 November 2026: Grade 6 ratio standards. Its expectations include ratio language, unit rates (limited to non-complex fractions), equivalent-ratio tables and plots, percent, and unit conversion. The progression above is our own proposal; **the other grade-level standards were not individually checked for this draft**, so it is not a verified K–12 Common Core alignment. No endorsement by that organization is implied. All examples and lesson wording here are original.

Original text and examples: **CC0 1.0**. Project status · Written grade-6 unit · Written grade-7 unit.

Kindergarten Mathematics: Counting, Comparing and Sorting (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 6 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

New (trial layout): the whole unit on one page, with a picture for each step.

Back to the kindergarten year plan

Big idea

Counting is not just saying numbers in order. To count a group you say one number for each thing, and the last number you say tells you how many there are, however the things are arranged. Once we can count, we can compare groups (more, fewer, the same) and sort things into groups and count each one.

Outcomes

By the end of the unit most children can:

1. Say the numbers from 1 to 10 in order, and start counting from a number other than 1 (for example "4, 5, 6...").
2. Count up to 10 objects by touching or moving each one once, and answer "how many?" with the last number they said.
3. Say that a group still has the same number when it is spread out or pushed together.
4. Recognise small groups (up to about 4 or 5) at a glance without counting, including dice patterns.
5. Say which of two groups (up to 10) has more, which has fewer, or that they are the same, by matching or by counting.
6. Sort objects into groups by one feature, count each group, and say which group has the most.

Prior knowledge

None is assumed. Many children can recite numbers further than they can count objects; that is normal. Some children will already count well past 10; give them bigger groups in the stretch tasks.

Lessons

Each lesson is about 25-30 minutes: a short whole-class start on the carpet, then hands-on work in small groups. Split a lesson over two days if needed.

1. Counting songs and touch counting
2. The last number tells how many

3. Quick looks
4. More, fewer or the same?
5. Sort it, count it

Materials (whole class unless noted)

- Counters for each group of four: about 40 cubes (at least 10 red and 10 blue per pair for lesson 4; 6 per child for the lesson 1 check), plus buttons, bottle tops or pebbles for variety (all large enough not to be swallowed). For lesson 4, a second kind of object in each colour (for example red cubes and blue bottle tops) lets children tell the two groups apart by shape as well as colour.
- Ten-frames (a 2 by 5 grid on card), one per child.
- Large dot cards showing 1 to 6 in dice patterns and in random patterns; two or three big foam dice.
- Two paper plates per pair. Small dice, one per pair (lesson 3).
- Optional: a puppet or soft toy who "makes mistakes" (lesson 2).
- Five toy cups and four toy spoons, or pictures of them (lesson 4 opening).
- A large sheet for the class tower chart (lesson 5), and closing-check trays of 3 toy cars, 5 balls and 1 doll (lesson 5).
- Access, as needed: numeral cards 1-10 to point to; dot cards with raised dots (glue dots or stickers) for children with low vision.
- A mixed tray per group for sorting (buttons or toy animals in 3-4 colours or kinds), and 3-4 hoops or trays.
- A counting rhyme, for example One, Two, Buckle My Shoe (traditional, public domain).

Assessment

Observe during group work and keep a class list with one column per outcome. A quick one-to-one check (2 minutes per child) near the end of the unit:

- Put 7 cubes in a line. "How many?" Watch: does the child touch each cube once, and answer "7" without counting again? (Answer: 7.)
- Spread the same 7 cubes out. "How many now?" A child who says "7" straight away understands that spreading out does not change the number. A child who counts again is still fine at this stage; note it.
- Show a dot card with 3. "How many?" (3, ideally without counting.)
- Show 5 red cubes and 3 blue cubes. "Which has more?" (red; 5 is more than 3.)
- "Count on from 4." (4, 5, 6, 7...)

Access for every part: pointing to numeral cards, signing or AAC counts the same as saying; a child can push each cube aside or tap the table instead of touching or using fingers; for low vision, use raised-dot cards and let the child feel the cubes; for the "more" question, use 5 red cubes and 3 blue bottle tops, so the groups differ in shape as well as colour.

Sources

- Common Core State Standards, Kindergarten Counting and Cardinality (read for this unit; used to check what is expected in kindergarten, not to claim alignment): https://www.thecorestandards.org/Math/Content/K/CC/
- K.CC.A.2 count forward from a given number; K.CC.B.4 one number name per object, the last number tells how many, the number is the same whatever the arrangement; K.CC.B.5

count up to 10 scattered objects; K.CC.C.6 say whether one group is greater than, less than or equal to another (groups up to ten), by matching or counting.
- Common Core, Kindergarten Measurement and Data (read for this unit): https://www.thecorestandards.org/Math/Content/K/MD/
- K.MD.B.3 classify objects into given categories, count each category and sort the categories by count.
- Common Core, Kindergarten introduction (read for the year plan): most kindergarten time should go to number. https://www.thecorestandards.org/Math/Content/K/introduction/
- Wikipedia, "Subitizing" (read for this unit): people can see small quantities, typically four or fewer, at a glance; larger sets can be seen quickly only in familiar patterns such as the six dots on a die. https://en.wikipedia.org/wiki/Subitizing

Known gaps and cautions

- Common Core's kindergarten counting goes much further (count to 100, numbers to 20, writing numerals). This unit only covers term 1; numerals and numbers to 20 are planned for term 2 in the year plan.
- The lesson order and timings are my choice, not taken from a source.
- Counting words and finger-counting habits differ between languages and families. Welcome children counting in their home language too.
- Peer check: Gemini 4 Argon did a bounded text, timing and answer-key check at d18fb8c (not an educator or accessibility review). Its notes (missing section timings, missing materials and too few counters, non-speaking, motor, low-vision and colour-vision routes) were fixed in the follow-up commit f79d546 (see PEERCHECKS.md), which Argon also diff-checked the same day.

Lesson 1: Counting songs and touch counting

Unit overview - Next: Lesson 2

About 25-30 minutes.

Goal

Children say the numbers 1 to 10 in order, start from a number other than 1, and count objects by touching or moving each one once.

Materials

- One, Two, Buckle My Shoe (traditional).
- Counters (cubes, buttons or bottle tops) and a ten-frame per child.

Steps

✎ Opening (5 min)

Say One, Two, Buckle My Shoe together with actions. Then count to 10 together, clapping once per number. Then "Start at 4": 4, 5, 6, 7, 8, 9, 10. Try starting at 2 and at 6.

✎ Main activity (18 min)

1. **Model touch counting (4 min).** Put 5 cubes in a row. Count them aloud wrongly on purpose: skip one, or count one twice. "Was I right?" Then count properly, touching each cube once and moving it to the side as you say its number.
2. **Partner counting (10 min).** In pairs, one child puts some cubes (up to 10) on a plate; the other counts them by moving each cube onto the ten-frame, one cube per square, saying one number for each. Swap.
3. **Count the room (4 min).** Count things the class can see: windows, chairs at one table, children wearing something blue. Touch or point at each one.

✓ Discussion questions (with answers) (3 min)

- What went wrong when I counted? You missed one out (or counted one twice).
- Why move the cube when you count it? So you know which ones you have already counted.
- If we start at 4, what comes next? 5.

✓ Closing check (with answers) (3 min)

Each child counts out 6 cubes onto their ten-frame from a pile. (Answer: 6 cubes, one in each of 6 squares.) Note who touches each one once.

Vocabulary

count, number, one, two, three... ten, next, start

Differentiation

- **Support:** counts up to 5 only; count together with an adult, hand over hand if the child likes that.
- **Access:** a child who cannot clap can tap the table, nod or move a counter for each number; pointing to numeral cards, signing or AAC counts the same as saying. For low vision, let the child feel each cube as they move it.
- **Stretch:** count on past 10 ("we have 10, add one more: 11"); count backwards from 10.

⚠ Safety

Use counters too large to swallow, especially with children who still put things in their mouths.

Teacher notes and misconceptions

- Saying the number names in order is not the same as counting objects; many children recite well but skip or double-count objects. Moving each object helps.
- Children who speed up the words but not their fingers usually lose the match. Slow, steady counting is the aim.

Lesson 2: The last number tells how many

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 25-30 minutes.

Goal

Children answer "how many?" with the last number they counted, and see that a group keeps the same number when it is spread out, pushed together or counted in a different order.

Materials

- Counters and two paper plates per pair.
- A puppet or soft toy (optional) who "makes mistakes".

Steps

✎ Opening (5 min)

Count 4 cubes with the class. Then ask "How many?" If children start counting again, say: "We already counted. The last number we said was 4, so there are 4." Repeat with 6 cubes.

✎ Main activity (18 min)

1. **Puppet puzzles (5 min).** The puppet counts 5 cubes in a line correctly. Then you spread them out and the puppet says "Oh no, now there are more!" Children explain: still 5, nothing was added or taken away. Count to check.
2. **Spread and squash (8 min).** In pairs: put some cubes (up to 10) on a plate and count them. Then spread them out across the table. "Do you need to count again?" Predict, then count to check. Then push them close together and do the same.
3. **Different order (5 min).** Count the same 7 cubes starting from a different cube. Is it still 7? (Yes.)

✓ Discussion questions (with answers) (3 min)

- When we count, which number tells us how many? The last one.
- I spread the 5 cubes out. How many now? Still 5.
- If I count from the other end, will I get a different answer? No, the same number.
- What would change the number? Adding cubes or taking some away.

✓ Closing check (with answers) (3 min)

Show 8 cubes in a line and count them together. Push them into a pile. "How many?" (8.) Ask a few children to explain why.

Vocabulary

how many, last, the same, spread out, close together, more, fewer

Differentiation

- **Support:** groups up to 5; let the child do the spreading themselves.
- **Stretch:** "I have 7. I take one away and put it back. How many now?" (7.) Or counts up to 15.

⚠ Safety

Use counters too large to swallow.

Teacher notes and misconceptions

- Many young children think a longer line has more things. This is common at this age and changes with experience; do not expect every child to be sure yet.
- A child who recounts every time is not wrong; they may just not trust the rule yet. Keep asking "Do you need to count again?"

Lesson 3: Quick looks

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 25 minutes.

Goal

Children say how many there are in small groups (up to about 4 or 5) at a glance, and recognise dice patterns up to 6.

Materials

- Large dot cards: 1 to 6 in dice patterns, and 2 to 5 in scattered patterns.
- Big foam dice; a small die and a ten-frame per pair.

Steps

✎ Opening (5 min)

Flash a dot card for about two seconds, then hide it. "How many did you see?" Start with 2, then 3, then 1. Ask: "Did you count, or did you just know?"

✎ Main activity (17 min)

1. **Flash cards (6 min).** Show dice-pattern cards from 1 to 6 in a random order, each for two seconds. Then show scattered 4 and 5. Ask which were easier.
2. **Roll and build (8 min).** In pairs: roll a die, say how many dots without counting if you can, then put that many cubes on the ten-frame. Partner checks by counting.
3. **Show me fingers (3 min).** "Show me 3 fingers." "Show me 5." "Show me 4 a different way." Children who find fingers hard can show the number with cubes or tap it on the table.

✓ Discussion questions (with answers) (3 min)

- Which cards could you know without counting? Usually the small ones (1 to 4) and the dice patterns, like 5 and 6.
- Why is the dice 6 easy even though it is quite big? It is a pattern we know: two rows of 3.
- Was the scattered 5 harder than the dice 5? Usually yes; the scattered one has no pattern to see.

✓ Closing check (with answers) (3 min)

Flash three cards: dice 3, scattered 2, dice 5. Children show the number with fingers. (Answers: 3, 2, 5. A child can instead hold up a numeral card, put that many cubes on the ten-frame, or sign; for low vision, use raised-dot cards to feel for a few seconds rather than a two-second flash.)

Vocabulary

quick look, pattern, dots, dice, at a glance

Differentiation

- **Support:** only 1 to 3; leave the card up longer.
- **Stretch:** two dice: how many altogether? Say how you saw it ("I saw 3 and 2").

⚠ Safety

No special hazards.

Teacher notes and misconceptions

- People can usually see up to about four things at a glance; bigger groups need a familiar pattern (Wikipedia, "Subitizing"). So scattered 5 or 6 will often need counting, and that is fine.
- Keep flashes short enough that children cannot count one by one, otherwise they practise counting instead of seeing.

Lesson 4: More, fewer or the same?

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 25-30 minutes.

Goal

Children compare two groups of up to 10 objects and say which has more, which has fewer, or that they are the same, by matching one to one or by counting.

Materials

- Cubes in two colours; two paper plates per pair.
- Five toy cups and four toy spoons (or pictures) for the opening.

Steps

✎ Opening (5 min)

Put out 5 cups and 4 spoons in a messy pile. "Is there a spoon for every cup?" A child puts one spoon in each cup. One cup is left with no spoon. "There are more cups. There are fewer spoons."

✎ Main activity (18 min)

1. **Match them up (7 min).** In pairs: one child puts red cubes on one plate, the other puts blue cubes on the other (up to 10 each). Line them up side by side, one red next to one blue. Which colour has some left over? That colour has more.
2. **Count to compare (6 min).** Now count each group instead. "Red has 6, blue has 4. Which number is more?" Check by matching.
3. **Make them the same (5 min).** "How can we make the groups the same?" Add to the smaller group or take from the bigger one, then match to check.

✓ Discussion questions (with answers) (3 min)

- Red has 6 and blue has 4. Which has more? Red.
- Which has fewer? Blue.
- If both groups have 5, what do we say? They are the same (equal).
- I have 3 big blocks and 5 tiny beads. Which group has more? The beads (5 is more than 3), even though the blocks are bigger.

✓ Closing check (with answers) (3 min)

Show 7 red cubes and 7 blue cubes spaced out so the blue line looks longer. "Which has more?" (They are the same: 7 and 7.) Ask a child to show by matching.

Vocabulary

more, fewer, the same, equal, match, left over

Differentiation

- **Support:** groups up to 5 with a big difference (5 and 2).
- **Access:** use two kinds of object as well as two colours (for example red cubes and blue bottle tops) for children with colour-vision differences, and say "cubes" and "tops" as well as the colours. Pointing, signing or AAC counts the same as saying.
- **Stretch:** groups that differ by one (8 and 9); "How many more?"

⚠ Safety

Use counters too large to swallow.

Teacher notes and misconceptions

- Children often judge by how long the line looks or how big the objects are. Matching one to one is the strongest way to show the truth.
- "Fewer" is a less familiar word than "less". Model it; accept "less" from children.

Lesson 5: Sort it, count it

Unit overview - Previous: Lesson 4

About 30 minutes.

Goal

Children sort objects into groups by one feature, count each group, and say which group has the most and which has the fewest.

Materials

- A mixed tray per group: for example buttons or toy animals in 3 colours, with a different number of each colour (for example 7 red, 4 blue, 2 yellow).
- 3 hoops or trays per group.
- A large sheet of paper for a class "tower" chart, and cubes.

Steps

✎ Opening (5 min)

Tip out a mixed tray on the carpet. "How could we put these into groups?" Take ideas: colour, size, kind of animal. Choose colour for today.

✎ Main activity (20 min)

1. **Sort (6 min).** In groups, children sort the tray into the hoops by colour. Check: is everything in the right hoop?
2. **Count (6 min).** Count each hoop. A child puts the same number of cubes in a tower for each colour (7 red cubes, 4 blue, 2 yellow).
3. **Compare the towers (5 min).** Stand the towers next to each other. Which is tallest? Which colour has the most? The fewest? Put the towers in order from most to fewest.
4. **Sort a new way (3 min).** Mix everything back and sort by a different rule (size, or animals that fly and animals that don't).

✓ Discussion questions (with answers) (2 min)

Answers for the example tray (7 red, 4 blue, 2 yellow):

- Which colour has the most? Red, 7.
- Which has the fewest? Yellow, 2.
- Put them in order from most to fewest. Red, blue, yellow.
- Can we sort the same things a different way? Yes, for example by size or kind.

✓ Closing check (with answers) (3 min)

Give each group a new small tray (for example 3 cars, 5 balls, 1 doll). They sort, count and tell you which group has the most. (Balls, 5.)

Vocabulary

sort, group, same, different, most, fewest, order

Differentiation

- **Support:** two groups only; fewer objects.
- **Stretch:** a child invents the sorting rule and the others guess it; or sort into groups with no colour words, only "has wheels / no wheels".

⚠ Safety

Use objects too large to swallow.

Teacher notes and misconceptions

- Children may change the rule halfway through (sorting by colour, then size). Ask "What is our rule?" and re-check.
- Colour sorting needs care for children with colour-vision differences; offer a sorting rule by shape or kind as an equal choice.
- The cube towers are a first step towards bar charts, which come later.

Kindergarten Mathematics: Numbers to 20, Making 5 and 10, and Shapes (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 6 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard.

Back to the kindergarten year plan - Term 1 unit: Counting, comparing and sorting

Big idea

Numbers keep going past 10, and we can write them down with numerals. A number can be split into parts in more than one way: 5 can be 4 and 1 or 3 and 2, and 10 can be 7 and 3 or 6 and 4. Shapes have names that stay the same when we turn them or make them bigger, and some shapes are flat while others are solid.

Outcomes

By the end of the unit most children can:

1. Count up to 20 objects in a line, and count out a given number (up to 20) from a bigger pile.
2. Write the numerals 0 to 10, and match a numeral card to a group (0 means "none"). Many children will also read numerals to 20; writing 11 to 20 is practised again in term 3.
3. Show 5 split into two parts in more than one way (for example 4 and 1, 3 and 2), with objects or fingers.
4. Use a ten-frame to say how many more make 10 (for example "7 and 3 more make 10").
5. Name circles, triangles, squares and rectangles whatever their size or which way they are turned, and say whether an object is flat or solid.

Prior knowledge

The term 1 unit: counting to 10 by touching each object once, knowing that the last number tells how many, quick looks at small groups, and comparing groups. Children who are still building those skills can keep working with groups up to 10 in every lesson here.

Lessons

Each lesson is about 25-30 minutes: a short whole-class start on the carpet, then hands-on work in small groups. Split a lesson over two days if needed.

1. Counting on to 20
2. Writing numbers
3. Ways to make 5
4. Make 10 with a ten-frame
5. Flat and solid shapes

Materials (whole class unless noted)

- Counters or cubes as in term 1 (too large to swallow): at least 25 per pair (pairs take turns with one pile), so that counting out 20 still leaves a bigger pile, and 10 per child for the ten-frame lesson; two-colour counters (red on one side, yellow on the other) if you have them.
- Ten-frames (a 2 by 5 grid on card), one per child; one large ten-frame for the carpet.
- Numeral cards 0 to 20; a number line 0 to 20 on the wall.
- Sand trays, chalkboards or whiteboards and pens for writing numerals.
- A cup for "shake and spill" (lesson 3).
- Flat shape cards (circles, triangles, squares, rectangles) in different sizes and colours, including long thin triangles and rectangles.
- Everyday solid objects: a ball, a tin or tube, a cardboard box, a dice or cube block, a party hat or cone.

Assessment

Observe during group work and keep a class list with one column per outcome. A quick one-to-one check (about 3 minutes per child) during the second week:

- Line up 15 cubes. "How many?" (15.) Then: "Give me 12 from this pile." (12; watch whether the child stops at 12.)
- Show the numeral cards 0, 6 and 9. "Which one means none?" (0.) "Show me 6 cubes." (6.) Ask the child to write 4 and 7 (or trace them, see Differentiation).
- "Here are 5 cubes. Hide some in your hand. How many are hiding?" Repeat once with a different split. (Any correct split, for example 2 showing and 3 hiding.)
- Show a ten-frame with 7. "How many more to make 10?" (3.)
- Show a square turned on its corner and a long thin triangle. "What shapes are these?" (square; triangle.) Hand the child a ball and a circle card. "Which is flat? Which is solid?" (circle flat; ball solid.)

Pointing, gesture, sign or a communication device all count as answers. Record yes, with help or not yet for each part.

Sources

- Common Core State Standards, Kindergarten Counting and Cardinality (read to check what is expected in kindergarten, not to claim alignment): https://www.thecorestandards.org/Math/Content/K/CC/
- K.CC.A.3 write numbers from 0 to 20, with 0 representing a count of no objects; K.CC.B.5 count up to 20 things in a line, a rectangular array or a circle (up to 10 if scattered), and count out a given number from 1-20.
- Common Core, Kindergarten Operations and Algebraic Thinking (read for this unit): https://www.thecorestandards.org/Math/Content/K/OA/
- K.OA.A.3 split numbers up to 10 into pairs in more than one way (for example 5 = 2 + 3 and 5 = 4 + 1); K.OA.A.4 for any number from 1 to 9, find the number that makes 10 when added to it.
- Common Core, Kindergarten Geometry (read for this unit): https://www.thecorestandards.org/Math/Content/K/G/
- K.G.A.2 name shapes regardless of their orientation or overall size; K.G.A.3 identify shapes as two-dimensional ("flat") or three-dimensional ("solid"); K.G.B.5 build and draw shapes.

- Common Core, Kindergarten Number and Operations in Base Ten (read for the year plan): https://www.thecorestandards.org/Math/Content/K/NBT/ - teen numbers as ten ones and some more ones. That idea is left for term 3.

Known gaps and cautions

- Writing equations such as 5 = 4 + 1 is left out on purpose; children say and show the parts. Add written equations if your setting expects them.
- Teen numbers as "ten and some more" (K.NBT.A.1) are planned for term 3, not taught here.
- Only one lesson on shapes. Common Core also expects position words, shape parts (sides, corners) and putting shapes together; the computing term 1 unit practises position words, and more shape work could follow in term 3.
- Numeral writing needs fine motor control that varies a lot at this age. Tracing, sand trays and choosing a card are all fine.
- Number words and finger-counting habits differ between languages and families. Welcome children counting in their home language too.
- The lesson order and timings are my choice, not taken from a source.
- Peer check: GPT-6.1 Terra did a bounded text and answer-key check of the README and lessons 1-5 at e676735 (square/rectangle sort convention, flat/solid test, counter quantities, plain-cube spill, counters instead of fingers, backwards-6 claim); fixed by the author in 51e79eb. Terra then checked that diff and noted lesson 1 cube numbers; lesson 1 now uses pairs taking turns with 25 cubes per pair, which Terra also diff-checked. Not a standards, classroom or full accessibility review.

Lesson 1: Counting on to 20

Unit overview - Next: Lesson 2

About 25-30 minutes.

Goal

Children say the numbers to 20 in order, count up to 20 objects in a line, and count out a given number from a bigger pile.

Materials

- Cubes or counters (at least 25 per pair, so a pile of more than 20 is left to count out from; pairs take turns, so they share one pile).
- The 0-20 number line on the wall.
- A long strip of paper or tape on the floor for lining things up.

Steps

✎ Opening (5 min)

Count together to 10 with a clap on each number, as in term 1. "Our numbers don't stop at 10! Let's keep going." Count on together from 10 to 20 while the teacher points along the number line. Say 11, 12 and 13 slowly; these names are tricky because they don't sound like "ten-one, ten-two".

✎ Main activity (18 min)

1. **Counting train (6 min).** On the carpet, children each add one cube to a long line on the tape while everyone counts. Stop at 20. "How many cubes in our train?" (20.) Take 3 away from the end and count again together. (17.)
2. **Count the line (7 min).** In pairs, one child makes a line of cubes between 10 and 20 long, then the partner counts it by touching each cube once. Do they agree? Put the cubes back and swap jobs.
3. **Get me some (5 min).** The adult says a number ("Get me 14"). The child counts out that many from the pile and stops. Check together.

✓ Discussion questions (with answers)

- What number comes after 10? 11.
- What number comes after 15? 16.
- I counted 12 cubes. If I move them into a circle, how many are there? Still 12 (moving them doesn't change how many).

- When you are getting 14 cubes, how do you know when to stop? When you say "14" (the last number you need).

✓ Closing check (with answers)

Hold up the number line and point to 18. Count together from 10 up to the pointed number. "What number did we stop on?" (18.) Ask: "What comes next?" (19.)

Vocabulary

eleven to twenty, count on, how many, stop

Differentiation

- **Support:** lines up to 12 or 15; count with the adult; line cubes on a printed strip with one box per cube.
- **Stretch:** count out 20 in a scattered pile and check by lining them up; count backwards from 20.

⚠ Safety

Use counters too large to swallow.

Teacher notes and misconceptions

- "Eleven" and "twelve" don't sound like other numbers, and "thirteen" to "nineteen" put the small number first. Expect children to skip or mix up numbers between 11 and 19 (for example 13 and 30).
- Counting out a given number is harder than counting a group that is already there, because the child has to remember the target and stop.

Lesson 2: Writing numbers

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 25-30 minutes.

Goal

Children write the numerals 0 to 10, match numeral cards to groups of objects, and know that 0 means "none".

Materials

- Numeral cards 0 to 10 (and 11 to 20 for stretch).
- Sand trays, chalkboards or whiteboards and pens.
- Small plates with groups of 0 to 10 counters.

Steps

✎ Opening (5 min)

Show an empty plate. "How many cookies on my plate?" (None.) "We have a number for none: zero." Write 0 big on the board. Then put 3 counters on the plate and write 3. Draw numerals in the air with big arm movements: 0, 1, 2, 3.

✎ Main activity (18 min)

1. **Sand and board writing (8 min).** Children write numerals 0 to 10 in sand trays or on boards, copying from a card. The adult watches the starting point and direction of each numeral. Choose four or five numerals per day, not all eleven at once.
2. **Match the plate (6 min).** In small groups, plates with 0 to 10 counters are spread out. Children count a plate and place the matching numeral card beside it. One plate is empty (0).
3. **Make my number (4 min).** A child turns over a numeral card; the partner puts that many counters on a ten-frame. Swap.

✓ Discussion questions (with answers)

- What does 0 mean? None, nothing there.
- This plate has 8 counters. Which card goes with it? 8.
- I wrote 6 backwards. Is it still 6? You meant 6, and often people can still tell, but not always; that is why we practise writing it the usual way, so everyone can read it easily.
- Which is more, 7 or 4? 7.

✓ Closing check (with answers)

Each child writes one numeral the teacher says (choose 2, 5 or 9 for different children) and holds it up. Check: does it match? Then ask the whole class to show "zero" fingers. (A closed fist; no fingers up.)

Vocabulary

zero, numeral, number, write, match

Differentiation

- **Support:** trace numerals on cards with dotted lines or sandpaper numerals; choose the right card instead of writing.
- **Stretch:** match plates with 11 to 20 counters to numeral cards 11 to 20.
- Children with limited hand control can build numerals from play dough or point to cards; the goal is knowing the numeral, not neat handwriting.

⚠ Safety

Use counters too large to swallow.

Teacher notes and misconceptions

- Reversed numerals (especially 2, 3, 5, 7 and 9) are very common at this age. Show the correct form calmly; don't mark it as a big mistake.
- Some children think 0 is "not a number". The empty plate helps.

Lesson 3: Ways to make 5

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 25-30 minutes.

Goal

Children show that 5 can be split into two parts in more than one way, using fingers, two-colour counters and hiding games.

Materials

- Five two-colour counters and a cup per pair. No two-colour counters? Use five cubes and a sheet of paper with a line down the middle: spill the cubes on the paper and count the cubes on each side of the line.
- Five counters per child for the opening and closing, for children who prefer counters to fingers.
- A puppet or soft toy for the opening.
- A 5-frame (one row of a ten-frame) per child.

Steps

✎ Opening (5 min)

Hold up one hand (children may use 5 counters instead of fingers from the start). "How many fingers?" (5.) Fold down one. "How many are up? How many are down?" (4 up, 1 down.) "4 and 1 make 5." Try 3 and 2. The puppet says "5 is only 4 and 1!" Children help show it another way.

✎ Main activity (18 min)

1. **Shake and spill (8 min).** Pairs put 5 two-colour counters in a cup, shake and spill. Count the red and the yellow (or, with plain cubes, the cubes on each side of the line). "3 red and 2 yellow make 5." Spill again. Children draw or tell their favourite spill.
2. **How many are hiding? (6 min).** One child puts 5 cubes on a 5-frame, then hides some under their hand. The partner says how many are hiding. Lift the hand to check.
3. **Make a record (4 min).** As a class, collect the spills on the board with dots: 5 and 0, 4 and 1, 3 and 2, 2 and 3, 1 and 4, 0 and 5.

✓ Discussion questions (with answers)

- I see 2 red. How many yellow make 5? 3.
- 4 are showing on the 5-frame. How many are hiding? 1.
- Is "3 red and 2 yellow" the same total as "2 red and 3 yellow"? Yes, both make 5.

- Can 5 be 5 red and 0 yellow? Yes; zero yellow is allowed.

✓ Closing check (with answers)

"Show me 5 on your fingers using both hands" (or with 5 counters in two groups). Children may show 3 and 2, 4 and 1, or 5 and 0 (all correct). Ask two children with different ways to show the class.

Vocabulary

and, make, part, hiding, showing, the same total

Differentiation

- **Support:** use 3 and then 4 before 5; keep the counters visible instead of hiding them.
- **Stretch:** ways to make 6 or 7; find all the ways and check none are missing.
- Children who can't fold fingers easily use counters or the 5-frame instead.

⚠ Safety

Use counters too large to swallow. Shake cups gently, low over the table.

Teacher notes and misconceptions

- The goal is seeing parts and wholes, not memorising facts yet.
- Some children recount all 5 every time instead of seeing the parts. That is fine at first; the 5-frame helps them see "one gap" or "two gaps".

Lesson 4: Make 10 with a ten-frame

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 25-30 minutes.

Goal

Children use a ten-frame to see how many more make 10, for any number from 1 to 9.

Materials

- A ten-frame and 10 counters per child.
- A large ten-frame for the carpet.
- Ten paper cups or skittles and a soft ball (optional, for step 3).

Steps

✎ Opening (5 min)

Show the big ten-frame, empty. "It has two rows of five boxes. When every box is full, we have 10." Fill it together, counting. Take some away and ask "How many empty boxes?" The empty boxes tell how many more make 10.

✎ Main activity (18 min)

1. **Fill it up (7 min).** Each child puts some counters on their frame (always filling the top row first, left to right). "How many counters? How many more to fill it?" The adult asks a few children each time.
2. **Ten-frame flash (6 min).** The teacher shows the big frame for a few seconds with 6, 8, 9 or 5. Children say how many and how many more make
3. Then show it again to check.
4. **Ten pins (5 min, optional).** Knock down skittles with a soft ball: "4 fell down, so how many are standing?" (6.) Count to check.

✓ Discussion questions (with answers)

- 7 counters are on the frame. How many more make 10? 3.
- The top row is full and the bottom row is empty. How many? 5.
- 9 are on the frame. How many more make 10? 1.
- I need 4 more to fill it. How many are on it now? 6.

✓ Closing check (with answers)

Show the big ten-frame with 8. Children hold up fingers for how many more make 10. (2.) Then show 4. (6.)

Vocabulary

ten-frame, full, empty, how many more, make 10

Differentiation

- **Support:** use one row (a 5-frame) and "how many more make 5"; count the empty boxes one by one.
- **Stretch:** "How many more make 10?" without the frame; two ten-frames for numbers past 10 ("one full frame and 3 more is 13").
- Children who struggle with fingers can point to the matching numeral card.

⚠ Safety

Use counters too large to swallow. If using skittles, roll the ball along the floor, not thrown, and keep a clear space.

Teacher notes and misconceptions

- Filling the top row first, left to right, makes amounts easy to see (6 is "5 and 1 more"). Keep this habit.
- Some children count the empty boxes as well as the counters. Ask "Which ones are counters? Which are empty?"

Lesson 5: Flat and solid shapes

Unit overview - Previous: Lesson 4

About 25-30 minutes. The one-to-one check from the unit overview can run during this lesson and over the following days.

Goal

Children name circles, triangles, squares and rectangles whatever their size or which way they are turned, and sort objects into flat and solid.

Materials

- Flat shape cards in many sizes and colours, including long thin triangles, long thin rectangles and squares turned on a corner.
- Solid objects: a ball, a tin or tube, a cardboard box, a cube block or dice, a party hat or cone.
- Two hoops labelled with a picture: "flat" (a paper shape) and "solid" (a block).
- Straws or sticks and play dough for building (optional).

Steps

✎ Opening (5 min)

Hold up a triangle. "What shape?" (Triangle.) Turn it upside down. "Now?" (Still a triangle.) Show a tiny triangle and a long thin one. "Still triangles? Yes: three straight sides and three corners." Do the same with a square turned on its corner.

✎ Main activity (18 min)

1. **Shape sort (6 min).** In small groups, children sort a mixed pile of shape cards into circles, triangles, squares and rectangles. The adult adds tricky cards (a thin triangle, a tilted square) and asks why. For this sort, squares go in the square group, even though a square is also a special kind of rectangle (see Stretch).
2. **Flat or solid? (6 min).** Pass around solid objects and flat cards. "Is it thin like a card, or is it thick enough to hold all round, like a ball or a box?" Children put each one in the flat hoop or the solid hoop. Name the solids if children are interested: ball (sphere), tin (cylinder), box, dice (cube), party hat (cone).
3. **Build it (6 min).** Make triangles and squares from straws and play dough, or draw them. Count the sides together.

✓ Discussion questions (with answers)

- I turned the square onto its corner. Is it still a square? Yes; turning it doesn't change the shape.

- This triangle is very long and thin. Is it a triangle? Yes; it has three straight sides.
- Is a ball flat or solid? Solid.
- Is a paper circle flat or solid? Flat.
- How many sides does a square have? 4.

✓ Closing check (with answers)

Hold up, one at a time: a tilted square, a big circle, a tin and a thin triangle. Children call out the name and "flat" or "solid". (Square, flat; circle, flat; tin (cylinder), solid; triangle, flat.)

Vocabulary

circle, triangle, square, rectangle, side, corner, flat, solid, turn

Differentiation

- **Support:** start with circles and squares only; feel the edges of shapes with eyes closed.
- **Stretch:** "Is every square a rectangle?" (Yes; a square is a special rectangle with all four sides the same length.) Find shapes around the room.
- Children with limited vision can use raised or cut-out shapes and real objects to feel.

⚠ Safety

Keep straw ends and small play dough pieces away from mouths. Choose solid objects without sharp edges.

Teacher notes and misconceptions

- Many children think a triangle must point upwards and a square on its corner is a "diamond". Show shapes in many positions all year.
- A paper shape is really very thin, not perfectly flat; "flat" is the right everyday word at this age.
- Faces of solids are flat shapes (a box has rectangle faces). Mention it if children notice; it isn't a goal here.

Kindergarten Mathematics: Adding, Taking Away, Teen Numbers and Comparing (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 6 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard.
>
> Text-checked by two other agents (Gemini 4 Argon, GPT-6.1 Terra); see Known gaps.

New (trial layout): the whole unit on one page, with a picture for each step.

Back to the kindergarten year plan - Term 2 unit: Numbers to 20, making 5 and 10, and shapes

Big idea

Adding is putting things together or getting more; taking away is taking some from a group or splitting it into parts. We can show both with objects, fingers, drawings, claps and acting out, and later with number sentences such as 3 + 2 = 5. The numbers 11 to 19 are a full ten and some more ones. Objects can be longer or shorter, heavier or lighter, and we find out which by putting them side by side or holding them, not just by looking.

Outcomes

By the end of the unit most children can:

1. Act out or use objects to solve a short story problem that adds or takes away, with totals up to 10, and say the answer.
2. Show the same problem in another way: fingers, a drawing, claps, or (for some children) a number sentence such as 4 + 3 = 7.
3. Add and take away within 5 quickly, for example "3 and 2 make 5" and "5 take away 1 is 4", with or without fingers.
4. Build a teen number as a full ten-frame and some more, and say it as "ten and ..." (for example 16 is ten and 6).
5. Compare two objects by length (lining up their ends) and by weight (holding one in each hand or using a balance), and say which is longer, shorter, heavier or lighter.

Prior knowledge

The term 1 and term 2 units: counting to 20, the last number tells how many, ways to make 5, and how many more make 10 on a ten-frame. Children who are still building those skills can work with totals up to 5 in every lesson.

Lessons

Each lesson is about 30 minutes: a short whole-class start on the carpet, then hands-on work in small groups. Split a lesson over two days if needed; the unit runs over about 3 weeks so each idea can be practised again in play and small groups.

1. Putting together
2. Taking away
3. Quick facts within 5
4. Teen numbers: ten and some more
5. Longer, shorter, heavier, lighter

Materials (whole class unless noted)

- Counters or cubes too large to swallow, in two colours: 10 per child (at least 5 red and 3 blue each, for lessons 1 and 2), plus 20 per pair for lesson 4.
- Small toys for acting out stories (for example toy animals or cars): about 10 per group of four, and a blue cloth or paper "pond" for lesson 1.
- Ten-frames: two per pair for lesson 4; one large ten-frame for the carpet.
- Paper cups (one per pair) and dot cards 0 to 5 (two sets per pair, mixed together, so that doubles such as 2 and 2 can come up) for lesson 3.
- Numeral cards 0 to 10 (for pointing answers in lessons 1 to 3) and 10 to 19 (lesson 4).
- Optional for lesson 2: 5 paper or felt apples and a picture of a tree.
- Optional for lesson 4: 20 lolly sticks or straws and a rubber band per pair.
- Whiteboards and pens, or paper and crayons, for drawings.
- For lesson 5, per group of four: four paper strips (yellow 10 cm, blue 15 cm, green 20 cm, red 25 cm), each also marked with a shape so colour is not the only clue (circle on yellow, triangle on blue, square on green, heart on red), a pencil, a crayon and a shoe; two lidded tubs of the same size, one filled with sand (star label) and one with cotton wool (moon label).
- For lesson 5, for the class: a simple bucket balance (or a home-made coat-hanger balance; see lesson 5), a large empty cardboard box and a small tub of sand.
- Masking tape for a start line on each table.

Assessment

Observe during group work and keep a class list with one column per outcome. A quick one-to-one check (about 3-4 minutes per child) during the third week:

- Put 4 toy frogs on a book "log". "4 frogs are on the log. 3 more hop on. How many now?" (7.) The child may use the toys, fingers or count on.
- Give the child 8 cubes. "Take 3 away. How many are left?" (5.)
- "What is 3 and 2?" (5.) "What is 5 take away 1?" (4.) An answer within a few seconds, with or without fingers, counts as quick.
- Show a full ten-frame and 5 loose counters. "How many altogether?" (15.) "Ten and how many more?" (5.)
- Give the green strip (20 cm, square) and the blue strip (15 cm, triangle) from lesson 5, not lined up. "Which is longer? Show me how you know." (Green; the child lines up the ends, or puts them side by side from the same starting point.) Then the star and moon tubs: "Which is heavier?" (The sand tub; check which label it has before you start.)

Pointing, gesture, sign or a communication device all count as answers. Name strips by colour and shape ("the green square strip") for children with colour-vision differences. Record yes, with help or not yet for each part.

Sources

- Common Core State Standards, Kindergarten Operations and Algebraic Thinking (read to check what is expected in kindergarten, not to claim alignment): https://www.thecorestandards.org/Math/Content/K/OA/
- K.OA.A.1 represent addition and subtraction with objects, fingers, mental images, drawings, sounds (for example claps), acting out situations, verbal explanations, expressions, or equations; K.OA.A.2 solve addition and subtraction word problems, and add and subtract within 10; K.OA.A.5 fluently add and subtract within 5.
- Common Core, Kindergarten Number and Operations in Base Ten: https://www.thecorestandards.org/Math/Content/K/NBT/
- K.NBT.A.1 compose and decompose numbers from 11 to 19 into ten ones and some further ones, and record them by a drawing or equation (such as 18 = 10 + 8).
- Common Core, Kindergarten Measurement and Data: https://www.thecorestandards.org/Math/Content/K/MD/
- K.MD.A.1 describe measurable attributes of objects, such as length or weight; K.MD.A.2 directly compare two objects with a measurable attribute in common and describe the difference (its example compares the heights of two children).

Known gaps and cautions

- Story problems here are mostly "add to" and "take from" with the result unknown. Problems where the start or change is unknown ("Some birds were there, 2 more came, now there are 5; how many were there at first?") are harder and are only a stretch here.
- Number sentences (+, - and =) are shown by the teacher and read together; writing them is optional. Add more written work if your setting expects it.
- English teen-number words hide the ten ("fourteen" says the 4 first, and "eleven" and "twelve" do not sound like "ten and 1" or "ten and 2"). Many other languages say teen numbers more regularly. Welcome counting in home languages.
- Measuring with units (counting how many cubes long) is not taught here; this unit only compares two objects directly.
- Pouring to compare how much containers hold is only a stretch activity (lesson 5), because it needs water or sand play set up.
- The Common Core example compares two children's heights. This unit compares objects instead, so that no child's body is compared in front of the class.
- The lesson order and timings are my choice, not taken from a source.
- Peer check: Gemini 4 Argon did a bounded text, answer-key and timing check on 6 November 2026 at 0f3aeb0 (recorded in PEERCHECKS.md); fixes are in 4abff39, which Argon also diff-checked the same day.
- Peer check: GPT-6.1 Terra did a bounded text and activity check on 9 November 2026 at 5c3db56 (recorded in PEERCHECKS.md); Terra's three lesson 5 points are fixed in aeb39b7, which Terra also diff-checked the same day (see PEERCHECKS.md); Terra's one residual note (check beforehand that the sand tub is heavier; adult-set-up stable balance) is fixed in c974026, and a follow-up (use a scale if the box does not fit the balance) in 131c037.

Lesson 1: Putting together

Unit overview - Next: Lesson 2

About 30 minutes.

Goal

Children act out and solve short story problems where more are added or two groups are put together, with totals up to 10.

Materials

- About 10 small toys per group of four (toy animals or cars).
- A blue cloth or paper "pond" for the carpet.
- Counters in two colours (10 per child, at least 5 red and 3 blue) and whiteboards or paper.

Steps

✎ Opening (5 min)

Tell a story and let children act it out. "3 ducks are on the pond." Three children stand on the blue cloth. "2 more ducks come." Two more join. "How many ducks now?" Count together: 5. Say: "3 and 2 more make 5."

✎ Main activity (20 min)

1. **Toy stories (8 min).** In groups, an adult tells stories with the toys: "4 cows are in the field. 2 more come. How many now?" (6.) "5 cars are in the car park. 3 more drive in." (8.) Children move the toys and count.
2. **Two groups together (7 min).** "Here are 4 red counters and 3 blue counters. How many counters altogether?" (7.) Children push the two groups together and count. Some will count on from 4 ("5, 6, 7"); praise both ways.
3. **Clap it, draw it (5 min).** "Clap 2 times. Now clap 3 more. How many claps?" (5.) Then children draw one story: dots or simple shapes are fine. The teacher writes the number sentence under one drawing, for example 4 + 2 = 6, and reads it: "4 and 2 make 6."

✓ Discussion questions (with answers)

- How did you find out how many there were altogether? Counting all, counting on from the first group, or fingers are all good answers.
- 4 cows and 2 more. Is the answer more or less than 4? More; we added some.
- Does it matter if we put the red counters first or the blue ones? No, 4 and 3 make 7, and 3 and 4 make 7.

✓ Closing check (with answers)

"6 bears are at the picnic. 2 more come. Show me how many with your fingers." (8.) Then: "I clap 1 time, then 4 more times. How many claps?" (5.)

Vocabulary

add, more, altogether, and, make, put together

Differentiation

- **Support:** totals up to 5; the adult moves the toys while the child counts.
- **Stretch:** a "start unknown" story: "Some birds sat on a fence. 2 more came. Now there are 5. How many were there at first?" (3.) Or reading the number sentence on the board.
- Children who do not want to act on the carpet can move toys instead. Pointing to numeral cards counts as an answer.
- Any child can show answers with counters, numeral cards or taps on the table instead of fingers or claps.

⚠ Safety

Use toys and counters too large to swallow. Keep acting-out moves to walking on the carpet.

Teacher notes and misconceptions

- Some children recount everything from 1 each time. That is fine at this stage; counting on is a later habit, so show it but do not insist.
- Children sometimes count the first group twice when they push groups together. Ask them to touch each one once, as in term 1.

Lesson 2: Taking away

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 30 minutes.

Goal

Children act out and solve story problems where some are taken away, or a group is split into two parts, starting from up to 10.

Materials

- About 10 small toys per group of four.
- Counters in two colours (10 per child, at least 5 red and 3 blue) and whiteboards or paper.
- 5 paper or felt apples and a picture of a tree (optional, for the opening).

Steps

✎ Opening (5 min)

"5 apples are on the tree." Put 5 apples on the tree picture. "The wind blows and 2 fall down." Take 2 away. "How many are still on the tree?" (3.) Say: "5 take away 2 is 3."

✎ Main activity (20 min)

1. **Toy stories (8 min).** "9 birds are on a wall. 4 fly away. How many are still on the wall?" (5.) "7 cars are in the car park. 2 drive away." (5.) "6 frogs are on a log. 6 jump in the water." (0; no frogs are left.) Children move the toys away and count what is left.
2. **Split it (7 min).** "Here are 6 toy animals. 2 are cats and the rest are dogs. How many dogs?" (4.) Children sort the toys into two groups and count each group. Do the same with 8 counters: 5 red and the rest blue. (3 blue.)
3. **Draw and cross out (5 min).** Children draw 7 circles and cross out 3. "How many are not crossed out?" (4.) The teacher writes 7 - 3 = 4 and reads it: "7 take away 3 is 4."

✓ Discussion questions (with answers)

- When we take some away, do we have more or fewer than before? Fewer.
- How did you find how many were left? Counting what was left, counting back, or fingers are all good answers.
- 6 frogs, and 6 jump away. How many are left? None, which is 0.

✓ Closing check (with answers)

"8 cars are in the car park. 3 drive away. Show me with your fingers how many are left." (5.)
Then: "10 balloons, 1 pops. How many now?" (9.)

Vocabulary

take away, left, fewer, none, zero, split

Differentiation

- **Support:** start from 5 or fewer; the child takes the toys away one at a time while counting.
- **Stretch:** "I had some sweets and ate 2. Now I have 3. How many did I have at first?" (5.) Or reading the number sentence on the board.
- Children may point to numeral cards or sign answers.
- Any child can show answers with counters, numeral cards or taps on the table instead of fingers or claps.

⚠ Safety

Use toys and counters too large to swallow.

Teacher notes and misconceptions

- Some children count the toys that went away instead of the ones left. Ask "Which ones are still here?" and point to them.
- Stories with food or animals should avoid upsetting events. Wind, flying away and driving away work well.

Lesson 3: Quick facts within 5

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 30 minutes.

Goal

Children add and take away within 5 quickly, using fingers, quick looks and the ways to make 5 from term 2.

Materials

- 5 counters and a paper cup per pair.
- Dot cards showing 0 to 5 dots (two sets per pair, mixed together, so that doubles such as 2 and 2 can come up).
- Numeral cards 0 to 5 for children who prefer to point.

Steps

✎ Opening (5 min)

Fingers warm-up: "Show me 3 fingers. Now 1 more. How many?" (4.) "Show me 5. Put 2 down. How many are up?" (3.) Go quickly; it is fine to look at your fingers.

✎ Main activity (20 min)

1. **Hide and show (8 min).** In pairs, one child puts 5 counters on the table, then hides some under the cup while the partner closes their eyes. The partner looks at what is left: "3 are showing, so 2 are hiding." Lift the cup to check. Swap roles. Then play with 4 counters.
2. **Dot card add (7 min).** Each child turns over two dot cards (for example 2 dots and 3 dots) and says the total (5). If the total is more than 5, put the cards back and try again.
3. **Quick quiz (5 min).** The teacher calls out facts and children show the answer with fingers: 2 and 2 (4), 1 and 3 (4), 4 and 1 (5), 5 take away 2 (3), 4 take away 1 (3), 5 take away 5 (0). The teacher writes two of them as number sentences, for example 2 + 2 = 4 and 5 - 2 = 3.

✓ Discussion questions (with answers)

- 3 counters are showing out of 5. How did you know 2 were hiding? We know 3 and 2 make 5; or we counted on from 3 to 5.
- Is 1 and 4 the same as 4 and 1? Yes, both make 5.
- What is 4 take away 0? 4; nothing was taken.

✓ Closing check (with answers)

Children show fingers: "3 and 1?" (4.) "5 take away 3?" (2.) "2 and 3?" (5.)

Vocabulary

and, make, take away, the same as, hiding, showing

Differentiation

- **Support:** play hide and show with 3 counters; use the numeral cards.
- **Stretch:** hide and show with 10 counters (links to make 10 in term 2).
- "Quick" means a few seconds, not a race. Do not time children or make the quiz a competition.
- Any child can show answers with counters, numeral cards or taps on the table instead of fingers or claps.
- Instead of closing their eyes, the partner can turn away, or the child can hide counters behind a card screen.

⚠ Safety

Use counters too large to swallow.

Teacher notes and misconceptions

- Children who already know a fact "by heart" still benefit from showing it with fingers or counters now and then.
- Short, frequent practice (a few facts a day in the rest of the term) helps more than one long session.

Lesson 4: Teen numbers: ten and some more

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 30 minutes.

Goal

Children build numbers from 11 to 19 as one full ten-frame and some more ones, and say them as "ten and ...".

Materials

- Two ten-frames and 20 counters per pair.
- A large pair of ten-frames for the carpet.
- Numeral cards 10 to 19.
- Optional: 20 lolly sticks or straws and a rubber band per pair, to make a bundle of ten.

Steps

✎ Opening (5 min)

Fill the big ten-frame, counting together to 10. "It is full. That is ten." Put 3 more counters on the second frame. "Ten and 3 more. Let's count on: 11, 12, 13. Ten and 3 is 13." Show the numeral card 13: "The 1 is for the full ten, and the 3 is for the 3 more." Write 13 = 10 + 3 on the board.

✎ Main activity (20 min)

1. **Build it (8 min).** The adult shows a numeral card from 11 to 19. Pairs fill the first frame to 10 and put the rest on the second frame. "What is 16?" (Ten and 6.) "What is 19?" (Ten and 9.) "What is 11?" (Ten and 1.)
2. **What number is it? (7 min).** The adult builds a full frame and some more. Children say the number: ten and 7 (17), ten and 4 (14), ten and 8 (18). Children who can, find the numeral card.
3. **Bundle of ten (5 min, optional).** Pairs count 10 sticks, put a rubber band round them, and add some loose sticks. "One bundle of ten and 5 loose sticks. How many?" (15.)

✓ Discussion questions (with answers)

- How do we know the first frame has 10 without counting? Every box is full, and a full frame is always 10.
- In the number 14, what does the 4 tell us? 4 more ones after the ten.
- Which is more: ten and 2, or ten and 8? Ten and 8 (18 is more than 12).

✓ Closing check (with answers)

Show a full frame and 6 more. "How many?" (16.) Then: "Show me ten and 2 with your counters." (A full frame and 2 more; 12.)

Vocabulary

ten, full, ones, ten and ..., teen numbers

Differentiation

- **Support:** start with 11, 12 and 13; count every counter from 1 and then say "ten and ...".
- **Stretch:** "What is 10 + 8?" without counters (18); or "18 is ten and how many?" (8.)
- Children who find fine motor work hard can use larger counters, or point while a partner places them.

⚠ Safety

Use counters too large to swallow. Rubber bands: an adult puts them on, and they are collected at the end.

Teacher notes and misconceptions

- In English, "fourteen" says the 4 first but we write 1 then 4, and "eleven" and "twelve" don't sound like ten and 1 or ten and 2. Expect reversals such as writing 41 for fourteen; showing ten and 4 on frames helps.
- Always fill the first frame completely before using the second, so the ten is easy to see.
- Some children think the 1 in 14 means one counter. The full ten-frame is what that 1 stands for; this is the start of place value, not the whole idea.

Lesson 5: Longer, shorter, heavier, lighter

Unit overview - Previous: Lesson 4

About 30 minutes.

Goal

Children compare two objects by length and by weight, by lining them up or holding them, and use the words longer, shorter, heavier and lighter.

Materials

Per group of four:

- Four paper strips in different colours and clearly different lengths: red 25 cm, blue 15 cm, green 20 cm, yellow 10 cm. Also draw a shape on each so colour is not the only clue: circle on yellow, triangle on blue, square on green, heart on red.
- A pencil, a crayon and a shoe.
- Masking tape stuck down along one edge of the table as a start line.
- Two lidded tubs of the same size: one full of sand (labelled with a star) and one full of cotton wool (labelled with a moon). Fill and close them before the lesson.

For the class:

- A simple bucket balance. If you do not have one, make one: hang a coat hanger from a hook or a broom handle held across two chairs, and tie a plastic bag or cup to each end at the same distance from the middle. Check it hangs level when empty. An adult sets it up so it is stable and cannot fall on children.
- A large empty cardboard box and a small tub of sand, for the opening.

Steps

✎ Opening (5 min)

Hold up the green strip (20 cm) and the blue strip (15 cm), with the green one held lower so the tops are uneven. "Which is longer?" Take guesses. Then put both on the floor with their ends on the same line. "Now we can see: the green strip is longer. To compare, we start them at the same place."

✎ Main activity (20 min)

1. **Start at the line (7 min).** Groups put two strips at a time on the start line and say which is longer and which is shorter. Then they put all four in order, shortest to longest (yellow, blue, green, red). Then they compare the pencil, the crayon and the shoe the same way, and say what they found (answers depend on the objects; any comparison made from the start line is right).

2. **Hold and feel (7 min).** Each child holds the star tub in one hand and the moon tub in the other. "Which is heavier? Which is lighter?" (The star tub, with sand, is heavier.) "They are the same size. Can you tell which is heavier just by looking?" (No; we had to hold them.)
3. **Balance (6 min, whole class).** Show the big empty box and the small tub of sand. "Which is heavier?" Take guesses, then put them in the balance. The side that goes down is heavier (usually the small sand tub). If the box is too big for your balance, children take turns holding the box in one hand and the sand tub in the other instead. Before the lesson, check that your sand tub really is heavier than the empty box (on the balance if the box fits, otherwise on a kitchen scale or a bigger balance); if not, add more sand or use a lighter box. "The bigger one is not always the heavier one."

✓ Discussion questions (with answers)

- Why do we put the strips on the same start line? So we compare the lengths fairly; if one starts further along, it can look longer when it is not.
- How can we find out which tub is heavier? Hold one in each hand, or use a balance.
- On a balance, which side is heavier? The side that goes down.

✓ Closing check (with answers)

Hold up the red strip (25 cm) and the yellow strip (10 cm) and line them up on the start line in front of the children. "Which is shorter?" (Yellow.) Then a child holds the star and moon tubs. "Which is lighter?" (The moon tub, with cotton wool.)

Vocabulary

longer, shorter, heavier, lighter, the same, start line, balance, compare

Differentiation

- **Support:** compare just two strips with a large difference (red and yellow).
- **Stretch:** pouring play: which of two containers holds more? Fill one with sand or water and pour it into the other. If it overflows, the first held more. If it does not overflow, that does not yet show which holds more: fill the second container and pour it back into the first. If that overflows, the second holds more; if neither overflows and each one fills the other, they hold about the same. A tall thin bottle and a short wide bowl often surprise children.
- Children who cannot hold the tubs can have each tub rested on their lap or palm in turn (a helper holds it steady), or watch the balance and say which side went down. (Pushing tubs along a table is not a fair way to compare weight: the tubs may slide differently.) Children with low vision can compare strips by touch, with ends lined up against the tape.
- For children with colour-vision differences, name strips by colour and shape ("the green square strip").

⚠ Safety

Keep the tubs light enough for a child to hold easily (a small yogurt-pot size of sand is enough) and check the lids are taped on. For pouring play, put down towels and wipe up spills at once so nobody slips. Keep sand away from faces.

Teacher notes and misconceptions

- Children often judge length by where an object ends, not by where it starts. The start line is the key habit here.
- Many children think bigger always means heavier. The box and sand tub show that this is not always true.
- Compare objects, not children. Comparing children's heights in front of the class can upset some children.

Grade 1 Mathematics: Adding and Taking Away Within 20 (5 lessons, about 4 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 9 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 1 year plan - Term 1. Builds on kindergarten term 3: Adding, taking away, teen numbers and comparing

Big idea

Adding and taking away are connected. A story problem can be about adding to, taking from, putting two parts together, splitting a whole into parts, or comparing two groups, and the unknown number can be at the end, in the middle or at the start. We do not have to count everything from 1: we can count on, make a ten, use doubles, or turn a take-away into "what do I add?". The equal sign means "is the same amount as", not "the answer comes next".

Outcomes

By the end of the unit most children can:

1. Solve story problems within 20 of all five kinds (adding to, taking from, putting together, taking apart, comparing), with the unknown at the end or in the middle, using objects, drawings or a number sentence with a box for the unknown.
2. Add by counting on from the larger number (for example 3 + 12: start at 12, say "13, 14, 15") and take away small numbers by counting back.
3. Add within 20 by making a ten (8 + 6 = 8 + 2 + 4 = 10 + 4 = 14) and add three numbers by finding two that make ten.
4. Use doubles and near doubles (6 + 7 = 6 + 6 + 1 = 13), and solve a take-away by thinking of the missing part (10 - 8: "8 and what make 10?").
5. Say whether a number sentence such as 4 + 1 = 5 + 2 is true or false, and find the missing number in sentences such as 8 + □ = 11.
6. Add and take away within 10 quickly (within a few seconds, with or without fingers).

Prior knowledge

The kindergarten units: counting to 20, ways to make 5 and 10 on a ten-frame, teen numbers as "ten and some more", and simple adding and taking-away stories within 10. Children still building these can work within 10 in every lesson.

Lessons

Each lesson is about 40 minutes: a short whole-class start, paired or group work with objects, and a closing check. Split a lesson over two days if needed; the unit runs over about 4 weeks, so each strategy should come back in short daily practice (5 minutes of quick facts or one story problem).

1. Story problems: adding, taking away, parts and wholes
2. Counting on and counting back
3. Making ten
4. Doubles, near doubles and fact families
5. Comparing and the equal sign

Materials (whole class unless noted)

- Linking cubes too large to swallow, in two colours: 20 per child (lessons 1 to 5). If colours are hard to tell apart, use two kinds of object instead (cubes and large buttons), so colour is not the only clue.
- Two ten-frames per child (lesson 3); one large ten-frame pair for the board.
- A 0 to 20 number line and a counter per pair (lesson 2), with numbers large enough to read and, if possible, raised marks (glue dots) at 0, 5, 10, 15 and 20. Optional: masking tape for a 0 to 20 track on the floor.
- A part-whole mat per pair (a sheet with one large box on top for the whole and two boxes below for the parts) for lessons 1 and 4.
- Digit cards 0 to 20 per pair, used for pointing to answers in every lesson.
- For lesson 3: a set of cards 1 to 9 per pair (for the pairs-to-ten game).
- For lesson 4, per group: two clean 12-hole egg boxes (or a 2 by 6 grid drawn on card); per pair: a set of fact-family triangle cards (see lesson 4).
- For lesson 5, per pair: true-or-false cards and missing-number cards (see lesson 5), support cards with one number on each side (such as 6 = 6 and 5 = 4), and two trays marked by touch (a rough sticker for true, a smooth one for false). Optional: a toy or home-made balance.
- Whiteboards and pens, or paper and pencils, for drawings and number sentences.

Assessment

Observe during paired work and keep a class list with one column per outcome. A one-to-one check (about 5 minutes per child) during the fourth week:

- "6 frogs are on a log. Some more hop on. Now there are 10. How many hopped on?" (4.) The child may use cubes, a drawing or 6 + □ = 10.
- "What is 8 + 5? Show me how you worked it out." (13. Making ten is 8 + 2 + 3 = 10 + 3; counting on from 8 is also fine.)
- "What is 6 + 7?" (13; a near double, 6 + 6 + 1, or any working strategy.)
- "What is 12 - 4?" (8; counting back, or "4 and what make 12?")
- Show the card 4 + 1 = 5 + 2. "Is this true or false?" (False: 4 + 1 is 5 and 5 + 2 is 7.)
- Quick facts within 10: 6 + 3 (9), 9 - 4 (5), 7 + 2 (9). An answer within a few seconds, with or without fingers, counts as quick.

Pointing to digit cards or the number line, sign, writing, or a communication device all count as answers. Record yes, with help or not yet for each part.

Sources

- Common Core State Standards, Grade 1 Operations and Algebraic Thinking (read to check what is usually expected in grade 1, not to claim alignment): https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/1/OA/
- 1.OA.A.1 word problems within 20 of adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions, using objects, drawings and equations with a symbol for the unknown; 1.OA.A.2 adding three whole numbers with a sum up to 20; 1.OA.B.3 order and grouping as strategies (its examples are 8 + 3 = 3 + 8 and 2 + 6 + 4 = 2 + 10 = 12), with no need for the formal names; 1.OA.B.4 subtraction as an unknown-addend problem (10 - 8); 1.OA.C.5 relating counting to adding and taking away; 1.OA.C.6 adding and taking away within 20, fluency within 10, with strategies such as counting on, making ten (8 + 6 = 8 + 2 + 4), decomposing to a ten (13 - 4 = 13 - 3 - 1), and known sums (6 + 7 = 6 + 6 + 1); 1.OA.D.7 the meaning of the equal sign and true or false equations (its examples include 7 = 8 - 1 and 4 + 1 = 5 + 2); 1.OA.D.8 finding the unknown in equations such as 8 + ? = 11 and 5 = _ - 3.
- Common Core, Grade 1 introduction (four critical areas, the first being addition, subtraction and strategies within 20): https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/1/introduction/

Known gaps and cautions

- Problems with the unknown at the start ("Some birds were on a wire, 3 more came, now there are 9") and comparing problems where the larger amount is unknown are the hardest kinds. As story problems they appear in lessons 1 and 5 only as stretch tasks; plan to return to them in term 2. Bare missing-number equations with the unknown first (5 = □ - 3, □ + 4 = 13) are core in lesson 5, step 3, because the box is easier to see than in a story.
- Fluency within 20 is not expected by the end of this unit; only within 10.
- The number line is used for counting on and back from small jumps only. Using it for bigger jumps comes later.
- The names in story problems are made up. Swap in names and objects that suit your class, but avoid using real children's belongings or families.
- Peer check: Gemini 4 Argon did a bounded text, timing and answer-key check at e844112 (not an educator or accessibility review). Keys and timings were correct. Its notes (materials lists out of step with lessons 2, 4 and 5; the start-unknown note did not match lesson 5's core missing-number cards; the equal-sign answer called 8 - 1 a sum) were fixed in the follow-up commit 8373393 (see PEERCHECKS.md), which Argon also diff-checked the same day.
- The lesson order and timings are my choice, not taken from a source.

Lesson 1: Story problems: adding, taking away, parts and wholes

Unit overview - Next: Lesson 2

About 40 minutes.

Goal

Children solve story problems within 20 about adding to, taking from, putting together and taking apart, with the unknown at the end or in the middle, and show them with cubes, drawings and number sentences.

Materials

- 20 linking cubes per child, in two colours (or two kinds of object).
- A part-whole mat per pair.
- Digit cards 0 to 20 per pair.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Remind children of kindergarten stories. "5 ducks are on the pond. 3 more come. How many now?" (8.) Write 5 + 3 = 8 and read it: "5 plus 3 equals 8." Then write 5 + 3 = □ and say: "The box is the number we don't know yet."

✎ Main activity (30 min)

1. **Adding to and taking from (10 min).** Tell each story twice; pairs use cubes or draw, then point to or write the answer.
    - "9 birds sit on a wire. 4 fly away. How many are left?" (5; 9 - 4 = 5.)
    - "7 children are on the bus. 6 more get on. How many now?" (13; 7 + 6 = 13.)
    - "12 apples are in a bowl. 5 are eaten. How many are left?" (7; 12 - 5 = 7.)
2. **Putting together and taking apart (10 min).** Show the part-whole mat: the whole goes in the top box, the two parts below.
    - "8 red flowers and 7 yellow flowers are in a pot. How many flowers?" (15; parts 8 and 7, whole 15.)
    - "There are 14 socks. 6 are spotty and the rest are striped. How many are striped?" (8; whole 14, one part 6, so the other part is 8.)
    - "11 cubes: split them into two towers any way you like. Write your two parts." (Any pair that makes 11, such as 5 and 6, 3 and 8, or 0 and 11.)
3. **The missing middle (10 min).** The change is unknown.
    - "6 frogs are on a log. Some more hop on. Now there are 10. How many hopped on?" (4; 6 + □ = 10.)

- "Ana had 11 cards. She gave some away. Now she has 7. How many did she give away?" (4; 11 - □ = 7.) Let children act it out with cubes: start with 6, add one at a time and count how many were added until there are 10.

✓ Discussion questions (with answers)

- In the bird story, did the number get bigger or smaller? Why? Smaller, because some birds flew away.
- In the sock story, nothing came or went. What happened instead? The socks were split into two groups; we knew the whole and one part.
- In the frog story, why is the answer not 10? 10 is how many there are at the end. The question asks how many hopped on, which is 4.

✓ Closing check (5 min, with answers)

"There are 13 buttons. 5 are red and the rest are blue. How many are blue?" Children draw, use cubes or point to a card. (8.) Then: "Write or point to a number sentence for it." (5 + 8 = 13, 13 - 5 = 8 or 5 + □ = 13 are all good.)

Vocabulary

plus, minus, equals, add, take away, altogether, left, part, whole, number sentence

Differentiation

- **Support:** totals up to 10; an adult reads the story again while the child moves cubes one at a time.
- **Stretch:** start-unknown stories: "Some birds were on a wire. 3 more came. Now there are 9. How many were there at first?" (6; □ + 3 = 9.)
- Any child can answer by pointing to a digit card, showing cubes, signing or using a communication device. Stories can be shown with pictures as well as told.

⚠ Safety

Use cubes too large to swallow.

Teacher notes and misconceptions

- Many children add any two numbers they hear. In the frog story they may say 16 (6 + 10). Ask them to act it out and check the story still makes sense.
- Keep the story language varied ("left", "now", "at first", "the rest") so children listen to the story rather than to key words.
- Several number sentences can fit one story; accept any that match it.

Lesson 2: Counting on and counting back

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 40 minutes.

Goal

Children add by counting on from the larger number, and take away 1, 2 or 3 by counting back, using a 0 to 20 number line.

Materials

- A 0 to 20 number line and a counter per pair.
- 20 linking cubes per child.
- Digit cards 0 to 20 per pair.
- Optional: a 0 to 20 track taped on the floor.

Steps

✎ Opening (5 min)

Count together from 0 to 20, then start from other numbers: "Start at 8 and count on 4: 9, 10, 11, 12." Children may hold up a finger for each number they say. If you have a floor track, volunteers can step along it while others count; children who prefer can move a counter on their table line instead.

✎ Main activity (30 min)

1. **Count on (10 min).** "9 + 3. Put your counter on 9. Don't count the 9 - we already have it. Jump 3: 10, 11, 12." (12.) Pairs try:
   - 8 + 3 (11)
   - 14 + 2 (16)
   - 15 + 4 (19) Check one with cubes: a tower of 9 and 3 more cubes is 12.
2. **Start with the bigger number (10 min).** "2 + 9. Is it quicker to start at 2 or at 9?" Build a tower of 2 and a tower of 9, join them, and turn the train round: it is the same train, 11 cubes. So 2 + 9 = 9 + 2 = 11. Pairs try, starting from the bigger number:
   - 3 + 12 (15)
   - 1 + 16 (17)
   - 4 + 13 (17)
3. **Count back (10 min).** "13 - 2. Put your counter on 13. Jump back 2: 12, 11." (11.) Pairs try:
   - 17 - 3 (14)
   - 20 - 1 (19)
   - 16 - 2 (14) Then check one with cubes: 17 cubes, take 3 away, count what is left (14).

✓ Discussion questions (with answers)

- When we count on from 9 for 9 + 3, why don't we say "9" again? The 9 is already there; we count only the 3 new jumps.
- Is 3 + 12 the same as 12 + 3? Yes. Both are 15; the same cubes in a different order.
- Would you count back to work out 15 - 9? It is slow and easy to lose track. Another way (thinking "9 and what make 15?") comes in lesson 4.

✓ Closing check (5 min, with answers)

"4 + 11. Show me where you start and where you land." (Start at 11; land on 15.) "16 - 3." (13.)

Vocabulary

count on, count back, jump, number line, start, land, the same as

Differentiation

- **Support:** totals up to 10; count on with cubes before using the line.
- **Stretch:** "I landed on 18 after jumping 3. Where did I start?" (15.)
- Number lines with large print and glue-dot marks at 0, 5, 10, 15 and 20 help children with low vision; they can also count cubes by touch. Children can give answers by pointing to the line, to digit cards, or by signing.

⚠ Safety

Floor tracks: walking only, with space between children. Keep the track away from doors and table corners.

Teacher notes and misconceptions

- The most common slip is counting the starting number as a jump: for 9 + 3 saying "9, 10, 11" and answering 11. Ask children to say the numbers they land on, not the number they start on.
- Counting back by more than 3 is error-prone; for bigger take-aways, use cubes or the strategies in lessons 3 and 4.

Lesson 3: Making ten

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 40 minutes.

Goal

Children know the pairs that make 10, use them to add within 20 by making a ten, and add three numbers by finding two that make ten.

Materials

- Two ten-frames and 20 counters or cubes per child, in two colours (or two kinds of object).
- Cards 1 to 9 per pair.
- A large pair of ten-frames for the board.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Quick pairs to ten. Show 7 on the big ten-frame. "How many more make 10?" (3.) Repeat with 4 (6), 9 (1), 5 (5) and 2 (8). Children answer with fingers, cubes or digit cards.

✎ Main activity (30 min)

1. **Pairs-to-ten game (8 min).** Pairs shuffle cards 1 to 9 and place them face down. One child turns a card; the other says, shows or points to the number that makes 10 with it. Swap after each card.
2. **Make a ten to add (12 min).** On the board: 8 + 6. Put 8 counters on the first ten-frame and 6 on the second. "The first frame needs 2 more to be full. Move 2 across." Now there are 10 and 4: 14. Write 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14. Pairs try with their frames:
    - 9 + 5 (14: move 1, so 10 + 4)
    - 7 + 5 (12: move 3, so 10 + 2)
    - 8 + 7 (15: move 2, so 10 + 5)
    - 9 + 8 (17: move 1, so 10 + 7)
3. **Three numbers (10 min).** "2 + 6 + 4. Can you see two numbers that make ten?" (6 and 4.) So 2 + 10 = 12. Pairs try:
    - 7 + 5 + 3 (15: 7 + 3 = 10, then 5 more)
    - 1 + 8 + 9 (18: 1 + 9 = 10, then 8 more)
    - "Bo has 3 red pencils, 5 blue pencils and 7 green pencils. How many pencils?" (15: 3 + 7 = 10, then 5 more.)

✓ Discussion questions (with answers)

- Why is 10 + 4 easier than 8 + 6? Ten and some more is a teen number we already know: ten and 4 is 14.
- For 9 + 5, why do we move just 1? 9 needs only 1 more to make 10.
- Does it matter which order we add three numbers in? No; the total is the same, so we can pick the order that makes a ten.

✓ Closing check (5 min, with answers)

"9 + 4. Show me on your ten-frames." (13: move 1, 10 + 3.) "5 + 3 + 5." (13: 5 + 5 = 10, then 3 more.)

Vocabulary

make ten, pair, full, ten-frame, ten and some more

Differentiation

- **Support:** stay with pairs to ten and with 9 + a small number, where only 1 counter moves.
- **Stretch:** take away through ten: 13 - 4 = 13 - 3 - 1 = 10 - 1 = 9. Use the ten-frames: take away the 3 loose counters first, then 1 from the full frame.
- Ten-frames can be made tactile (counters in an egg box or a 2 by 5 grid of cups) for children with low vision. Children can answer by pointing to digit cards or moving counters instead of speaking.

⚠ Safety

Use counters too large to swallow.

Teacher notes and misconceptions

- Some children move the wrong number of counters, or move counters from the first frame to the second. Ask "Which frame is nearly full?" first.
- Writing 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14 is a teacher record. Children do not need to write chains like this yet, and it should not be used to suggest that "=" means "and then".

Lesson 4: Doubles, near doubles and fact families

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 40 minutes.

Goal

Children use doubles and near doubles to add, and solve a take-away by thinking of the missing part ("8 and what make 10?").

Materials

- Two empty 12-hole egg boxes (or a 2 by 6 grid on card) and 12 cubes per group. One box shows doubles up to 6 + 6; the second box lets the group show doubles up to 10 + 10, one row of 10 holes across the two boxes.
- 20 linking cubes per child.
- A part-whole mat per pair.
- Fact-family triangle cards per pair: triangles with three numbers at the corners, for example 8, 4, 12; 3, 7, 10; 6, 9, 15. The biggest number (the whole) is at the top corner.
- Digit cards 0 to 20 per pair.
- Whiteboards and pens, or paper and pencils, for recording number sentences.

Steps

✎ Opening (5 min)

Doubles. Fill one row of an egg box with 6 cubes and the other row with 6. "6 and 6 make?" (12.) Children build cube towers in pairs of the same height: 5 and 5 (10), 7 and 7 (14), 8 and 8 (16), 9 and 9 (18), 10 and 10 (20).

✎ Main activity (30 min)

1. **Doubles practice (8 min).** In pairs, one child builds a tower of up to 10 cubes; the other builds the same and says the double. Record: 7 + 7 = 14.
2. **Near doubles (10 min).** "6 + 7. 7 is one more than 6, so it is double 6 and 1 more." 6 + 6 + 1 = 12 + 1 = 13. Pairs check with towers, then try:
    - 7 + 8 (15: 7 + 7 + 1)
    - 8 + 9 (17: 8 + 8 + 1)
    - 5 + 6 (11: 5 + 5 + 1)
3. **Fact families and "what do I add?" (12 min).** Take the triangle 8, 4,
4. With cubes on the part-whole mat: whole 12, parts 8 and 4. Together find four number sentences: 8 + 4 = 12, 4 + 8 = 12, 12 - 8 = 4, 12 - 4 = 8. Then: "10 - 8. Think: 8 and what make 10?" (2.) Pairs try:
    - 15 - 7 (think 7 + □ = 15; 8)
    - 13 - 9 (think 9 + □ = 13; 4)

- Write the four sentences for the triangle 3, 7, 10 (3 + 7 = 10, 7 + 3 = 10, 10 - 3 = 7, 10 - 7 = 3).

✓ Discussion questions (with answers)

- How does knowing 6 + 6 help with 6 + 7? 6 + 7 is one more than 6 + 6, so it is 13.
- If you know 8 + 4 = 12, what else do you know? 4 + 8 = 12, 12 - 8 = 4 and 12 - 4 = 8.
- For 13 - 9, why is thinking "9 and what make 13?" easier than counting back 9? Counting back 9 is long and easy to lose track of; 9 needs 1 to make 10 and 3 more to make 13, so 4.

✓ Closing check (5 min, with answers)

"7 + 7." (14.) "7 + 8." (15.) "14 - 7." (7, because 7 + 7 = 14.)

Vocabulary

double, near double, one more, fact family, whole, part

Differentiation

- **Support:** doubles up to 5 + 5 with fingers or cubes, and fact families for totals up to 10.
- **Stretch:** near doubles the other way: 8 + 7 = 8 + 8 - 1 = 15. Or make their own triangle card and write all four sentences.
- Egg boxes and cube towers can be checked by touch. Children can show answers with cubes, digit cards or sign.

⚠ Safety

Use clean egg boxes (washed or never used for eggs) and cubes too large to swallow.

Teacher notes and misconceptions

- Some children think 12 - 8 and 8 - 12 are the same, because 8 + 4 and 4 + 8 are. Show with cubes that we cannot take 12 away from 8 cubes; in a take-away, the whole comes first.
- Near doubles only help once doubles are quick. Keep short daily doubles practice going.

Lesson 5: Comparing and the equal sign

Unit overview - Previous: Lesson 4

About 40 minutes.

Goal

Children solve "how many more?" and "how many fewer?" problems, decide whether number sentences are true or false, and find missing numbers.

Materials

- 20 linking cubes per child, in two colours (or two kinds of object).
- True-or-false cards, one set per pair: 6 = 6; 7 = 8 - 1; 5 + 2 = 2 + 5; 4 + 1 = 5 + 2; 10 = 6 + 4; 9 + 1 = 10 + 1.
- Missing-number cards: 8 + □ = 11; 5 = □ - 3; 6 + 6 = □; □ + 4 = 13; 15 - □ = 9.
- Optional: a toy or home-made balance and equal-sized cubes.
- Digit cards 0 to 20 per pair; whiteboards and pens.
- Support cards with one number on each side (6 = 6, 5 = 4), and two trays marked by touch (a rough sticker for true, a smooth one for false), for children who need them (see Differentiation).

Steps

✎ Opening (5 min)

Build a tower of 9 cubes and a tower of 6, side by side. "How many more cubes does the tall tower have?" Children see 3 extra at the top. "9 is 3 more than 6. 6 is 3 fewer than 9."

✎ Main activity (30 min)

1. **Comparing stories (10 min).** Pairs build towers to match each story.
   - "Mia has 12 shells. Tom has 8. How many more shells does Mia have?" (4.)
   - "Bo has 5 stickers. Ana has 3 more than Bo. How many stickers does Ana have?" (8.)
   - "Sam has 11 marbles. Lee has 4 fewer than Sam. How many marbles does Lee have?" (7.)
2. **True or false? (10 min).** "The equal sign means both sides are the same amount." If you have a balance, show 3 + 2 cubes on one side and 5 on the other: it balances. Pairs sort the cards into true and false, using cubes to check:
   - 6 = 6 (true)
   - 7 = 8 - 1 (true)
   - 5 + 2 = 2 + 5 (true)
   - 4 + 1 = 5 + 2 (false: 5 on one side, 7 on the other)
   - 10 = 6 + 4 (true)

    - 9 + 1 = 10 + 1 (false: 10 and 11) Then: "Change one number to make 4 + 1 = 5 + 2 true." (For example 4 + 3 = 5 + 2, or 4 + 1 = 5 + 0.)
3. **Missing numbers (10 min).** Pairs find each box using cubes or a strategy from this unit:
    - 8 + □ = 11 (3)
    - 5 = □ - 3 (8)
    - 6 + 6 = □ (12)
    - □ + 4 = 13 (9)
    - 15 - □ = 9 (6)

✓ Discussion questions (with answers)

- Some people think 7 = 8 - 1 is wrong because the answer should come last. Is it wrong? No. Both sides are 7, so it is true; the equal sign can have the single number or the calculation on either side.
- In the sticker story, does "more" mean we add? Here yes: Ana has Bo's 5 and 3 more, 8. But in the shell story, "how many more" is found by comparing or taking away (12 - 8 = 4). Read the whole story, not one word.
- How did you find 5 = □ - 3? Think: what number, take away 3, leaves 5? 5 + 3 = 8.

✓ Closing check (5 min, with answers)

"Is 3 + 4 = 7 true? Is 7 = 3 + 4 true?" (Both true.) "9 + □ = 16." (7.)

Vocabulary

compare, more than, fewer than, how many more, equal sign, the same as, true, false, missing number

Differentiation

- **Support:** compare towers up to 10; true-or-false cards with only one number on each side first (6 = 6, 5 = 4).
- **Stretch:** comparing with the bigger amount unknown: "Lee has 7 marbles. That is 4 fewer than Sam. How many has Sam?" (11.) Or make up a true-or-false card for a partner.
- Children can sort cards by touch-marked trays (a rough sticker for true, a smooth one for false), point, sign or use a device. Read cards aloud for children who need it.

⚠ Safety

Use cubes too large to swallow. Keep a home-made balance low and steady on the table.

Teacher notes and misconceptions

- "=" read as "makes" leads children to call 7 = 8 - 1 false and to write answers such as 8 + □ = 11 with □ = 19 (adding all the numbers they see). Read "=" as "is the same as".

- Comparing problems are harder than adding to or taking from. Lining up two towers and looking at the extra part helps more than any rule.
- The names are made up; use names that do not belong to children in the class if comparisons might feel personal.

Grade 1 Mathematics: Tens and Ones to 100 (5 lessons, about 4 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 9 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 1 year plan - Term 2. Builds on term 1: Adding and taking away within 20

Big idea

Ten ones can be grouped and treated as one thing, a "ten". A two-digit number tells us how many tens and how many ones: 47 is 4 tens and 7 ones. Because of this we can count big collections quickly, compare numbers by looking at the tens first, find 10 more or 10 less without counting in ones, and add by putting tens with tens and ones with ones.

Outcomes

By the end of the unit most children can:

1. Count to 120 starting from any number below 120, and read and write the numbers in that range.
2. Count a collection of up to about 100 objects by grouping it into tens, and say how many tens and ones there are (for example, 4 towers of ten and 7 loose cubes is 47).
3. Explain that 11 to 19 are a ten and some ones, and that 10, 20, 30 ... 90 are 1 to 9 tens and no ones.
4. Compare two two-digit numbers by looking at the tens and then, if the tens are the same, the ones, and record the result with >, = or <.
5. Find 10 more and 10 less than a two-digit number without counting in ones, and add and take away multiples of ten (30 + 40, 80 - 30).
6. Add a one-digit number or a multiple of ten to a two-digit number within 100, using cubes or drawings, including sums where the ones make a new ten (27 + 5 = 32).

Prior knowledge

The term 1 unit (adding and taking away within 20, making ten) and the kindergarten idea of teen numbers as "ten and some more". Children who are still building these can work with numbers to 50 in every lesson.

Lessons

Each lesson is about 40 minutes: a short whole-class start, paired work with cubes, and a closing check. Split a lesson over two days if needed; the unit runs over about 4 weeks, so counting, 10 more and 10 less, and comparing should come back in short daily practice (5 minutes).

1. Grouping in tens and counting to 120
2. Tens and ones on a place-value mat

3. Comparing two-digit numbers
4. Ten more, ten less, and adding and taking tens
5. Adding within 100

Materials (whole class unless noted)

- Linking cubes too large to swallow, all one colour or mixed: 100 per pair (lessons 1 to 5). Children snap them into towers of ten.
- Optional for lesson 1: craft sticks, about 60 per pair, with strips of paper and tape to wrap bundles of ten (no rubber bands, which may contain latex).
- A tray or sheet of paper per pair to keep each collection together (lesson 1), and some collections to count: about 30 to 60 small objects per pair, too large to swallow (cubes, large buttons, counters).
- A place-value mat per pair (lessons 2, 3 and 5): a sheet split into a "tens" side on the left and a "ones" side on the right, with a strip of card glued down the middle as a ridge and a rough sticker on the tens side, so the two sides can be told apart by touch.
- Two sets of digit cards 0 to 9 per pair (lessons 2, 3 and 5), large print, with each digit outlined in glue or string (or with braille labels) so the cards can be read by touch.
- Symbol cards >, < and = per pair (lesson 3), with the symbol outlined in glue or string so it can be felt. Optional: a toy or home-made balance.
- A 1 to 100 chart (ten rows of ten, 1 at the top left) per pair and a large one for the board (lesson 4), with three counters per child. Large print; if possible, a raised dot on every number in the 10s column (10, 20 ... 100).
- A number strip from 95 to 120 for the board (lesson 1), and a 0 to 120 counting track or the class number line if you have one.
- Whiteboards and pens, or paper and pencils, for drawings and number sentences.

Assessment

Observe during paired work and keep a class list with one column per outcome. A one-to-one check (about 5 minutes per child) during the fourth week:

- "Count on from 97. I'll tell you when to stop." Stop at 112. (98, 99, 100, 101 ... 112; saying 97 first is fine too.) Then: "Write one hundred and four." (104, not 1004.)
- Show 4 towers of ten and 7 loose cubes. "How many cubes?" (47.) Then: "Show me 63 with cubes." (6 towers of ten and 3 loose cubes.)
- "How many tens and ones are in 16? In 50?" (1 ten and 6 ones; 5 tens and 0 ones.)
- Show the cards 58 and 85. "Which is greater? Put a symbol between them." (85 is greater; 58 < 85, because 5 tens is less than 8 tens.)
- "What is 10 more than 46? What is 10 less than 46?" (56; 36.)
- "What is 70 - 40?" (30: 7 tens take away 4 tens is 3 tens.)
- "What is 34 + 8? Show me with cubes or a drawing." (42: 4 + 8 = 12, a new ten and 2 ones, so 3 tens + 1 ten = 4 tens and 2 ones.) "What is 25 + 30?" (55.)

Pointing to cubes, digit cards or the chart, sign, writing, or a communication device all count as answers. Record yes, with help or not yet for each part.

Sources

- Common Core State Standards, Grade 1 Number and Operations in Base Ten (read to check what is usually expected in grade 1, not to claim alignment): https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/1/NBT/
- 1.NBT.A.1 count to 120 starting at any number less than 120, and read and write numerals in that range; 1.NBT.B.2 the two digits of a two-digit number are amounts of tens and ones, with the special cases (a) 10 as a bundle of ten ones called a "ten", (b) 11 to 19 as a ten and one to nine ones, (c) 10, 20 ... 90 as one to nine tens and 0 ones; 1.NBT.B.3 compare two two-digit numbers using the meaning of the digits, recording with >, = and <; 1.NBT.C.4 add within 100, including a two-digit number and a one-digit number, and a two-digit number and a multiple of 10, with models, drawings and place-value strategies, adding tens and tens, ones and ones, and sometimes composing a ten; 1.NBT.C.5 find 10 more or 10 less mentally, without counting, and explain the reasoning; 1.NBT.C.6 subtract multiples of 10 in the range 10 to 90 from multiples of 10, with a positive or zero answer.
- Common Core, Grade 1 introduction (four critical areas, the second being whole number relationships and place value): https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/1/introduction/

Known gaps and cautions

- Taking a one-digit number or a two-digit number away from a two-digit number (for example 42 - 7 or 56 - 23) is not taught here; only taking away multiples of ten. Those come in grade 2.
- Adding two two-digit numbers that are not multiples of ten (34 + 25) is not core; it appears only as a stretch task in lesson 5.
- Hundred charts differ: some start at 0, and some count upwards from the bottom. This unit uses 1 to 100 with 1 at the top left. If your class uses another chart, change "down a row" and "up a row" to match.
- Calling > and < a crocodile's mouth that "eats the bigger number" is a tradition some classes use, not part of the source. This unit asks children to read the symbols as words ("is greater than", "is less than"); the crocodile picture is optional.
- Fluency with 10 more and 10 less is expected; fluency with adding within 100 is not.
- Peer check: Gemini 4 Argon did a bounded text, link, timing and answer-key check at 944d536 (not an educator or accessibility review). Links, counts, timings and keys were correct. Its notes (some side-by-side builds in lessons 1 and 3 needed more than 100 cubes; the one-to-one check did not cover writing numbers past 100 or outcome 3; digit cards had no tactile marking) were fixed in the follow-up commit 096f355 (see PEERCHECKS.md), which Argon also diff-checked the same day.
- The lesson order and timings are my choice, not taken from a source.

Lesson 1: Grouping in tens and counting to 120

Unit overview - Next: Lesson 2

About 40 minutes.

Goal

Children count a large collection by grouping it into tens, say how many tens and ones there are, and count on past 100 up to 120.

Materials

- 100 linking cubes per pair.
- A collection of about 30 to 60 small objects per pair (cubes, large buttons or counters, too large to swallow), each on a tray or sheet of paper.
- Optional: about 60 craft sticks per pair, with paper strips and tape for wrapping bundles of ten.
- A number strip from 95 to 120 on the board, and a counting track or class number line if you have one.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Count together in ones from different starting numbers: "Start at 28 and count to 35." "Start at 56 and count to 64." Stop at the decade changes (29 to 30, 59 to 60) and ask: "What comes after 39?" (40.) Children who prefer not to say the numbers aloud can point along the number line or tap a finger for each number.

✎ Main activity (30 min)

1. **How many? (10 min).** Give each pair a collection of 30 to 60 objects. "Guess how many, then count them. How can you count so you don't lose track?" Let pairs try their own way first. Then show one way: make groups of ten (in lines, or as towers of linking cubes) and count the groups "10, 20, 30, 40", then the loose ones "41, 42, 43". Pairs count their collection again in tens and write the number. For example 4 groups of ten and 3 more is 43.
2. **Make a ten (10 min).** "Ten ones can become one ten." Each pair snaps cubes into towers of ten. If you have craft sticks, pairs wrap groups of ten sticks with a paper strip to make bundles. The teacher shows some towers and loose cubes and pairs say how many:
    - 2 towers and 6 cubes (26)
    - 5 towers and 0 cubes (50)
    - 1 tower and 8 cubes (18)

    - 7 towers and 4 cubes (74) Then pairs build numbers the teacher says: 35 (3 towers, 5 cubes); 60 (6 towers, no cubes); 19 (1 tower, 9 cubes).
3. **Past 100 (10 min).** Count from 95 to 120 together, pointing to the strip on the board: "...98, 99, 100, 101..." Show that the numbers after 100 go on like the numbers after 0: 101, 102, 103 ... 110, 111 ... 120. Pairs take turns: one says a start number between 95 and 110, the other counts on five numbers (for example 107: 108, 109, 110, 111, 112). Children write two of the numbers they said on a whiteboard (such as 104 and 111).

✓ Discussion questions (with answers)

- Why is counting in tens quicker than counting in ones? We count 4 groups instead of 40 single objects, and if we lose our place we only recount one group.
- Is a tower of ten cubes one thing or ten things? Both: it is ten ones, and we can also count it as one ten.
- What comes after 109? 110. (A common answer is "200"; see teacher notes.)

✓ Closing check (5 min, with answers)

Show 3 towers of ten and 6 loose cubes. "How many?" (36.) "Count on from 98 to 103." (99, 100, 101, 102, 103.)

Vocabulary

ten, tens, ones, group, bundle, tower, count on, hundred

Differentiation

- **Support:** collections up to 30; count to 50 instead of 120.
- **Stretch:** "I have 9 towers and 12 loose cubes. How many cubes?" (102: the 12 loose cubes make another tower and 2, so 10 towers and 2.) This needs more than one pair's 100 cubes: join with another pair, or draw lines for tens and dots for ones.
- Children with low vision or who are blind can count by touch: towers of ten feel different from loose cubes. Children can show answers by building with cubes, pointing to the number line, writing, signing, or using a communication device.

⚠ Safety

Use objects too large to swallow. Keep craft sticks on the tables, and no rubber bands (latex allergies, and they flick).

Teacher notes and misconceptions

- Some children count the towers in ones ("1, 2, 3, 4") and then the loose cubes ("5, 6, 7"), giving 7 instead of 43. Ask them to count one tower cube by cube, then say "so this tower is 10".

- Past 100, children often say "200" after 109, or write 101 as "1001" (one hundred, then one). Say and write the numbers together, and point out that 101 has three digits, like 100.

Lesson 2: Tens and ones on a place-value mat

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 40 minutes.

Goal

Children show two-digit numbers as tens and ones on a mat, explain that 11 to 19 are a ten and some ones and that 10, 20 ... 90 are tens with no ones, and say what each digit means.

Materials

- 100 linking cubes per pair, with some already snapped into towers of ten.
- A place-value mat per pair (tens on the left, ones on the right; card ridge down the middle and a rough sticker on the tens side).
- Two sets of digit cards 0 to 9 per pair, large print with a raised outline.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Show 2 towers and 4 loose cubes. "How many?" (24.) Put the towers on the tens side of a large mat and the loose cubes on the ones side, then put the digit card 2 under the tens side and 4 under the ones side. "The 2 tells us 2 tens. The 4 tells us 4 ones."

✎ Main activity (30 min)

1. **Teen numbers (10 min).** "Show 13 on your mat." (1 tower, 3 cubes.) Pairs show 11 to 19 in turn, putting digit cards under each side, and say the sentence "13 is 1 ten and 3 ones." Ask: "What is the same about all these numbers?" (They all have 1 ten; the first digit is always 1.)
2. **Decades (10 min).** "Show 30." (3 towers, no loose cubes.) "What digit goes on the ones side?" (0, because there are no ones.) Pairs show 20, 50, 80 and 90, and say "50 is 5 tens and 0 ones." Then ask: "How many tens is 100?" (10 tens.) Pairs check by putting 10 towers together.
3. **Same digits, different numbers (10 min).** Pairs show 27 and then 72 (2 tens and 7 ones; 7 tens and 2 ones). "Are they the same?" (No: 72 has many more cubes.) Then one child picks two digit cards and puts them on the mat; the partner builds the number with cubes and says it. Swap roles. Examples to check: 4 and 6 (46 or 64), 9 and 1 (91 or 19), 5 and 0 (50, or 05, which is just 5).

✓ Discussion questions (with answers)

- In 46, what does the 4 mean? 4 tens, which is 40.

- Why is there a 0 in 60? To show there are no ones; without it the number would be 6.
- Is 19 more like 10 or like 90? Like 10: it has only 1 ten (19 is 1 ten and 9 ones).

✓ Closing check (5 min, with answers)

"Show 52 on your mat." (5 towers, 2 cubes.) "What does the 5 mean?" (5 tens, 50.) "How many tens and ones in 80?" (8 tens, 0 ones.)

Vocabulary

place value, tens, ones, digit, tens side, ones side, teen numbers

Differentiation

- **Support:** numbers to 30; one digit card set and a ready-made tower per ten.
- **Stretch:** "Show 34 a different way, using only 2 towers." (2 towers and 14 loose cubes.)
- The ridge and the rough sticker let children tell the two sides of the mat apart by touch, so colour is never the only clue. Children can answer by pointing, building, signing, or using a communication device.

⚠ Safety

Use cubes too large to swallow.

Teacher notes and misconceptions

- The teen number names are irregular: "thirteen" says the 3 first, but the 1 ten is written first. Children often write 13 as 31. Saying "1 ten and 3 ones" before writing helps.
- Some children read the digits but not their value ("46 is a 4 and a 6"). Keep asking "4 what?" until the answer is "4 tens".

Lesson 3: Comparing two-digit numbers

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 40 minutes.

Goal

Children compare two two-digit numbers by looking at the tens first and then the ones, and record the result with the symbols >, = and <.

Materials

- 100 linking cubes per pair, with towers of ten.
- A place-value mat per pair.
- Two sets of digit cards 0 to 9 per pair, large print with a raised outline.
- Symbol cards >, < and = per pair, with raised outlines.
- Optional: a toy or home-made balance.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Build 34 and 43 side by side with towers and cubes. "Which has more cubes? How can you tell quickly?" (43: it has 4 tens, and 34 has only 3 tens. The ones do not matter here, because one ten is more than any number of ones up to 9.)

✎ Main activity (30 min)

1. **Tens first, then ones (10 min).** Pairs build each pair of numbers and say which is greater:
    - 36 and 32 (36; same tens, so look at the ones: 6 is more than 2)
    - 50 and 49 (50; 5 tens is more than 4 tens, even though 49 has 9 ones)
    - 41 and 14 (41; 4 tens is more than 1 ten)
    - 28 and 28 (they are equal) Each time, children say the sentence: "36 is greater than 32."
2. **The symbols (10 min).** Write 36 > 32 and read it: "36 is greater than 32." Write 32 < 36 and read it: "32 is less than 36." The pointed end points to the smaller number; the open side faces the greater number. (Some classes call the symbol a crocodile's mouth that opens towards the bigger number; that picture is optional.) Pairs put a symbol card between number cards and read the sentence aloud or sign it:
    - 63 and 36 (63 > 36)
    - 47 and 49 (47 < 49)
    - 80 and 80 (80 = 80)
    - 15 and 51 (15 < 51)

3. **Make the bigger number (10 min).** Each child in a pair takes two digit cards without looking and arranges them to make the greatest number they can (with 3 and 7, make 73). Partners put their numbers side by side, place the right symbol between them and read the sentence. The child with the greater number keeps a cube; play several rounds. Tell children that "0" cannot go first in this game, since 05 is just 5.

✓ Discussion questions (with answers)

- Why do we look at the tens first? Because one ten is more than all the ones in a number (at most 9), so the number with more tens is greater.
- When do we need to look at the ones? When the tens are the same, as in 36 and 32.
- You have the cards 3 and 7. What is the greatest number you can make, and the smallest? 73 and 37.

✓ Closing check (5 min, with answers)

"Which symbol goes between 63 and 36?" (>, 63 is greater.) "Between 47 and 49?" (<, 47 is less.) "Read this: 28 = 28." ("28 is equal to 28.")

Vocabulary

greater than, less than, equal to, compare, symbol, tens first

Differentiation

- **Support:** compare numbers within 30, and build both numbers every time before choosing a symbol. Use a balance to show "equal" if you have one.
- **Stretch:** "Find all the numbers that make this true: 4□ > 46." (47, 48, 49.)
- Raised symbol cards let children feel which way the symbol points. Children can answer by placing a card, pointing, signing, or using a communication device.

⚠ Safety

Use cubes too large to swallow.

Teacher notes and misconceptions

- Every number built in this lesson fits in one pair's 100 cubes (the biggest side-by-side build, 50 and 49, uses 99).
- Children who look at the ones first may say 49 is greater than 50 ("9 is bigger than 0"). Build both: 4 towers and 9 cubes next to 5 towers.
- The symbols are often reversed. Reading the whole sentence aloud, from left to right, is a better check than remembering which way the symbol faces.

Lesson 4: Ten more, ten less, and adding and taking tens

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 40 minutes.

Goal

Children find 10 more and 10 less than a two-digit number without counting in ones, and add and take away multiples of ten.

Materials

- A 1 to 100 chart per pair (ten rows of ten, 1 at the top left) and a large one for the board, with three counters per child.
- 100 linking cubes per pair, with towers of ten.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Count in tens together from 0 to 100, then from 3: "3, 13, 23, 33 ..." up to 93. "What changes and what stays the same?" (The tens digit goes up by one; the ones digit stays 3.)

✎ Main activity (30 min)

1. **Patterns on the chart (10 min).** Pairs put a counter on 24 and then on the number just below it (34) and just above it (14). "What happens when we move down one row?" (The number goes up by 10.) "Up one row?" (It goes down by 10.) Pairs try from 57 (down 67, up 47) and from 81 (down 91, up 71).
2. **10 more, 10 less (10 min).** Build 34 with towers and cubes. "Add one tower. How many now?" (44.) "Take away one tower from 34." (24.) Only the tens change. Pairs answer without counting in ones, then check on the chart or with cubes:
    - 10 more than 46 (56)
    - 10 less than 71 (61)
    - 10 more than 89 (99)
    - 10 less than 15 (5)
    - 10 more than 90 (100)
3. **Adding and taking tens (10 min).** "30 + 40. 3 tens and 4 tens make 7 tens, so 70." Pairs use towers only:
    - 50 + 20 (70)
    - 30 + 60 (90)
    - 80 - 30 (50)
    - 90 - 40 (50)

    - 60 - 60 (0) Each time ask children to say it in tens: "8 tens take away 3 tens is 5 tens."

✓ Discussion questions (with answers)

- Why does only the tens digit change when we add 10? We add one ten and no ones, so the ones stay the same.
- What is 10 less than 15, and where is it on the chart? 5. It is in the same column as 15, one row up.
- How is 7 - 4 like 70 - 40? 7 ones take away 4 ones is 3 ones; 7 tens take away 4 tens is 3 tens, or 30.

✓ Closing check (5 min, with answers)

"What is 10 more than 52?" (62.) "10 less than 52?" (42.) "What is 70 - 20?" (50.)

Vocabulary

10 more, 10 less, row, column, hundred chart, multiple of ten

Differentiation

- **Support:** use towers and cubes for every question before the chart; numbers to 50.
- **Stretch:** "What is 20 more than 37? 30 less than 85?" (57; 55.)
- Large-print charts with a raised dot on each number in the 10s column help children with low vision or who are blind find the rows. Counters mark numbers, so colour is never needed. Children can answer by pointing, building, signing, or using a communication device.

⚠ Safety

Use cubes and counters too large to swallow.

Teacher notes and misconceptions

- Some children count on ten ones every time ("46, 47, 48 ... 56"). That gives the right answer but misses the point; ask "What changed?" and build it with one tower.
- On the chart, the numbers that end in 0 sit at the right-hand end of each row, so 30 is in the row with 21 to 29, not with 31. Children may expect 30 to start a new row.

Lesson 5: Adding within 100

Unit overview - Previous: Lesson 4

About 40 minutes.

Goal

Children add a multiple of ten or a one-digit number to a two-digit number within 100, putting tens with tens and ones with ones, and make a new ten when the ones add up to 10 or more.

Materials

- 100 linking cubes per pair, with towers of ten.
- A place-value mat per pair.
- Two sets of digit cards 0 to 9 per pair, large print with a raised outline.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Quick questions from lesson 4: "10 more than 63?" (73.) "40 + 30?" (70.) "What is 7 + 5?" (12.) "How many tens and ones is 12?" (1 ten and 2 ones.)

✎ Main activity (30 min)

1. **Adding tens (10 min).** "23 + 30. Build 23 on your mat. Add 3 towers to the tens side. How many tens now? How many ones?" (5 tens, 3 ones: 53.) Only the tens change. Pairs build and write the number sentence:
    - 46 + 20 (66)
    - 58 + 40 (98)
    - 15 + 70 (85)
2. **Adding ones (10 min).** "32 + 5. Build 32, add 5 loose cubes to the ones side." (3 tens, 7 ones: 37.) Only the ones change. Pairs try:
    - 61 + 7 (68)
    - 44 + 4 (48)
    - 83 + 6 (89)
3. **Making a new ten (10 min).** "27 + 5. Build 27, add 5 loose cubes. How many ones now?" (12.) "Can we make a new tower?" Snap 10 of the ones into a tower and move it to the tens side: now 3 tens and 2 ones, 32. Write it as 7 + 5 = 12, so 20 + 12 = 32. Pairs try, making a new tower each time:
    - 38 + 6 (44)
    - 45 + 9 (54)
    - 56 + 4 (60; the new ten leaves no ones)

✓ Discussion questions (with answers)

- In 23 + 30, why do we add the 3 tens to the tens side, not the ones side? 30 is 3 tens; 23 + 3 would be 26, which is a different sum.
- When do we need to make a new ten? When the ones add up to 10 or more, as in 27 + 5, where 7 + 5 = 12.
- Why is 56 + 4 exactly 60? 6 + 4 = 10 ones, which is a new ten, so we have 6 tens and no ones.

✓ Closing check (5 min, with answers)

"36 + 7. Show me with cubes or a drawing." (43: 6 + 7 = 13, a new ten and 3 ones, so 4 tens and 3 ones.) "52 + 30?" (82.)

Vocabulary

add, tens, ones, make a new ten, number sentence, sum

Differentiation

- **Support:** questions without a new ten first; totals up to 50; build every question with cubes.
- **Stretch:** "34 + 25. Add the tens, then the ones." (30 + 20 = 50, 4 + 5 = 9, so 59.) Then: "27 + 35." (50 + 12 = 62.)
- Children can draw tens as lines and ones as dots instead of using cubes. Children who are blind or have low vision can build on the tactile mat. Answers can be given by pointing to digit cards, building, signing, or a communication device.

⚠ Safety

Use cubes too large to swallow.

Teacher notes and misconceptions

- A common error in 23 + 30 is adding the 3 to the ones (answer 26) or writing "2330". Saying "30 is 3 tens" before building helps.
- In 27 + 5, some children write 212 ("2 tens and 12 ones"). Making the new tower with real cubes, and moving it to the tens side, shows why the answer is 32.
- Use the last part of the week for the one-to-one check in the unit overview.

Grade 1 Mathematics: Measuring Length and Putting Shapes Together (5 lessons, about 4 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 9 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 1 year plan - Term 3. Builds on term 2: Tens and ones to 100

Big idea

To compare lengths fairly, we line the ends up. When two things cannot be put side by side, a third thing (a piece of string) can carry one length to the other. To say how long something is, we lay copies of one small unit end to end, with no gaps and no overlaps, and count them. Shapes have a few things that make them that shape (a triangle is closed and has three straight sides), and things that do not matter (colour, size, which way it is turned). Shapes can be put together to make new shapes.

Outcomes

By the end of the unit most children can:

1. Put three objects in order from shortest to longest, lining up the ends.
2. Compare two lengths that cannot be put side by side by using a third object, and explain the result in words ("the string was the same as the table, and the rug was longer than the string, so the rug is longer").
3. Measure a length by laying equal units end to end with no gaps or overlaps, and say the length as a number of units ("8 cubes long").
4. Say whether a shape is a triangle, square or rectangle using its sides and corners, not its colour, size or which way it is turned, and build one with craft sticks or draw one.
5. Put two or more shapes together to make a new shape (two triangles make a square), and use that new shape to make a bigger one.

Prior knowledge

The kindergarten units on comparing (longer, shorter, taller) and naming flat shapes, and counting to 20 and beyond from terms 1 and 2.

Lessons

Each lesson is about 40 minutes: a short whole-class start, paired work and a closing check. Split a lesson over two days if needed; the unit runs over about 4 weeks, so measuring and shape sorting should come back in short daily practice (5 minutes).

1. Shortest to longest

2. Comparing with a piece of string
3. Measuring with equal units
4. What makes a triangle a triangle?
5. Putting shapes together

Materials (whole class unless noted)

- Lesson 1: two pencils of different lengths; per pair, two sets of three stiff card strips (set 1: 8, 14 and 20 cm; set 2: 11, 17 and 24 cm), each strip marked with a letter (A, B, C) and the same number of raised dots (1, 2, 3); a hardback book or ruler as an edge to line ends up against; per child, a recording sheet and glue stick; 6 spare strips and a large book to stand up as a screen for the closing check (see lesson 1).
- Lesson 2: masking tape; six measuring stations prepared before the lesson (see lesson 2); per pair, one piece of string about 1.5 m long, cut by an adult, and two clothes pegs; per child, a recording sheet and two small answer cards (a table picture and a rug picture); two picture cards for the closing check (see lesson 2); the teacher's answer key for the stations.
- Lesson 3: per pair, 30 linking cubes all the same size (the cubes from term 2), 10 unit cards (identical card rectangles, each exactly as long as two cubes), and three card strips to measure, cut to exactly 6, 8 and 10 cubes long; per child, a recording sheet; a tray with four demonstration strips (one with a gap, one with an overlap, one with mixed cubes and unit cards, and one measured correctly).
- Lesson 4: per pair, a set of 24 shape cards cut from card (so edges can be felt): 8 triangles of different sizes, colours and turns, 4 squares, 4 rectangles, and 8 "not quite" shapes (a three-sided shape with a gap, a three-sided shape with one curved side, a four-sided shape that is not a rectangle, a circle, a half-circle, and three other shapes with more than four sides); four large shape cards for the closing check, hand-sized copies of them and a small blue triangle (see lesson 4); a sorting mat with two areas labelled "triangle" and "not a triangle" (words, a drawn triangle and a raised outline); per child, 8 craft sticks (checked for splinters) and a whiteboard and pen.
- Lesson 5: per pair, a bag of card shapes: 8 right-angled triangles (two equal 5 cm sides), 4 squares (5 cm sides), 2 rectangles (5 cm by 10 cm), 4 half-circles (10 cm across) and 4 quarter-circles (5 cm radius); 6 outline cards to fill (see lesson 5); per child, a blank sheet, pencil, whiteboard and pen; a larger set of the card shapes for the teacher to show.
- Assessment: one set of lesson 1 strips, the lesson 2 picture cards, a lesson 3 strip and cubes, 6 shape cards, 8 craft sticks and 4 triangles from lesson 5.

Assessment

Observe during paired work and keep a class list with one column per outcome. A one-to-one check (about 6 minutes per child, so about 2.5 hours for 25 children, spread over the fourth week):

- Give three strips from set 2, ends not lined up. "Put them in order from shortest to longest." (11, 17, 24 cm. Watch whether the child lines up the ends.)
- Show the two lesson 2 picture cards and say: "Sam's string was just as long as the table. The string was shorter than the rug. Which is longer, the table or the rug?" (The rug.)
- Give the 8-cube strip and loose cubes. "How long is this strip in cubes?" (8 cubes, laid end to end with no gaps or overlaps.) Then show the gap strip from lesson 3: "Is this measured right? Why not?" (No: there is a gap, so the count is too small.)
- Give 6 shape cards (2 triangles turned different ways, a square, a rectangle, the three-sided shape with a gap, and the shape with a curved side). "Give me all the triangles." (The 2

triangles only.) "Why is this one not a triangle?" (It is not closed / one side is not straight.) "Which card is a rectangle but not a square?" (The rectangle.)
- Give 4 craft sticks. "Make a triangle." Then, with 4 sticks, "Make a square." (A closed shape with three straight sides; then four equal sides and four square corners. Drawing the shapes on a whiteboard counts too.)
- Give 4 right-angled triangles. "Make a square." (Long sides together.) "Now make a rectangle using that square." (Make a second square from the other two triangles and put the two squares side by side.)

Pointing, moving the pieces, sign, writing, or a communication device all count as answers. Record yes, with help or not yet for each part.

Sources

- Common Core State Standards, Grade 1 Measurement and Data (read to check what is usually expected in grade 1, not to claim alignment): https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/1/MD/
- 1.MD.A.1 order three objects by length; compare the lengths of two objects indirectly by using a third object. 1.MD.A.2 express the length of an object as a whole number of length units by laying multiple copies of a shorter object end to end; the length is the number of same-size units that span it with no gaps or overlaps; limited to objects spanned by a whole number of units.
- Common Core, Grade 1 Geometry: https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/1/G/
- 1.G.A.1 distinguish defining attributes (for example, triangles are closed and three-sided) from non-defining attributes (colour, orientation, overall size); build and draw shapes with defining attributes. 1.G.A.2 compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles and quarter-circles) to make a composite shape, and compose new shapes from the composite shape. A footnote says children should use transitivity to make indirect comparisons but need not use the term.
- Common Core, Grade 1 introduction (four critical areas, the third being linear measurement as iterating length units and the fourth composing and decomposing shapes): https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/1/introduction/

Known gaps and cautions

- Peer check: Gemini 4 Argon did a bounded text, link, timing, number and shape-geometry check at 1ba989a (not an educator or accessibility review). Its notes (the assessment did not check building or drawing shapes, or making a bigger shape from a made shape; station lines in lesson 2 needed feelable marks at both ends, not only the start) were fixed in 049cf5e, which Gemini 4 Argon also diff-checked the same day (see PEERCHECKS.md). This is a peer check by an AI agent, not an educator review.
- Not covered here: telling time (1.MD.B.3), data with up to three categories (1.MD.C.4; the term 3 computing unit in the year plan sorts and counts with a picture chart) and halves and quarters (1.G.A.3). A school following the Common Core would need to teach these elsewhere.
- Three-dimensional shapes (cubes, cylinders, cones) are named in 1.G.A.2 but this unit uses flat shapes only.
- Standard units (centimetres, inches) are not taught; the strip lengths in centimetres are for the teacher to cut them.

- The unit never measures or compares children's bodies (heights, hands, feet). That is a choice made here, not from the source, so that nobody's size is compared in front of the class.
- The strip lengths, station objects and shape sets are examples, not from a source.

Lesson 1: Shortest to longest

Unit overview - Next: Lesson 2

About 40 minutes.

Goal

Children put three objects in order by length and explain that the ends must be lined up to compare fairly.

Materials

- Two pencils of different lengths (for example 10 cm and 15 cm).
- Per pair: two sets of three stiff card strips (set 1: 8, 14 and 20 cm; set 2: 11, 17 and 24 cm). Mark each strip with a letter (A, B, C, in a mixed order so the letters do not give the answer) and the same number of raised dots (one dot for A, two for B, three for C).
- Per pair: a hardback book or ruler to line the ends up against.
- Per child: a recording sheet with three empty boxes labelled "shortest", "in between" and "longest", and a glue stick.
- For the closing check: 6 spare strips (two sets of three, made like set 1 and set 2) and a large book to stand up as a screen.

Steps

✎ Opening (5 min)

Hold the two pencils upright in one fist so the short pencil sticks up higher than the long one (its bottom end is hidden lower down in your hand). "Which pencil is longer?" Many children will say the one that sticks up. Open your hand and lay both pencils on the table with their ends against the edge of a book. "Now which is longer?" Agree: **to compare lengths, line up the ends.**

✎ Main activity (30 min)

1. Model with set 1: put the three strips against the book edge, ends touching it, and run a finger along to the other ends. "Which end sticks out furthest? That strip is the longest." Say the order aloud: shortest, in between, longest.
2. Pairs order set 1 against their own book edge. One child lines up the ends; the other says the order. Swap roles and do set 2.
3. Each child glues one set on their recording sheet, shortest to longest.
4. Stretch: "Mix both sets together. Can you put all six strips in order?" (8, 11, 14, 17, 20, 24 cm.)

✓ Discussion questions (with answers)

- "Why did the short pencil look longer at the start?" (Its ends were not lined up with the other pencil's ends.)
- "B is longer than A. C is longer than B. Is C longer than A?" (Yes.)
- "If I turn the longest strip round, is it still the longest?" (Yes; turning it does not change its length.)

✓ Closing check (5 min, with answers)

Behind the standing book, lay out three of the spare strips with their ends not lined up, then lift the book away. Each child shows on their fingers (1, 2 or 3 dots) which strip is the longest, all at the same time, then which is the shortest. Repeat once with the other spare set. (Children who line the ends up in their heads or ask to move the strips are doing the right thing; let them move them.)

Vocabulary

long, longer, longest; short, shorter, shortest; in between; length; line up the ends

Differentiation

- Support: use two strips before three, with a big difference in length.
- Stretch: the six-strip order above; or order three classroom objects (a crayon, a glue stick, a pencil case) chosen by the child.
- Blind or low-vision children: line the strips up against the book edge by touch and feel which end sticks out furthest; the raised dots name the strips.
- Children who cannot use their fingers easily can nudge strips with a palm or say/point to the order; a partner can line up the ends while they direct.
- For the closing check, children who do not use fingers can point, nod at the right strip as the teacher touches each one, or sign; blind children feel the three strips after the book is lifted.
- Colour is never the only clue; letters and dots name the strips.

⚠ Safety

Card strips only; no scissors for children in this lesson.

Teacher notes and misconceptions

- Children often compare only one end (whichever sticks out at the top or right). The pencil opening is there to make that visible.
- "Longest" and "tallest" are the same idea; "tallest" is used when the object stands up.

Lesson 2: Comparing with a piece of string

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 40 minutes.

Goal

Children compare two lengths that cannot be put side by side by carrying one length to the other with a piece of string, and explain the result.

Materials

- Masking tape and six measuring stations, set up before the lesson. Each station has two lengths in different places, marked A and B with a letter and a raised tape tab at both ends of each line (a folded tab at the start and a small block or a dot of tape at the finish), so the ends can be felt. An example set (not from a source; change it to fit your room):
    1. Two floor lines in different corners: A 100 cm, B 120 cm.
    2. A line on a table top (A, 60 cm) and a line on the floor (B, 50 cm).
    3. A line on a wall at about 80 cm from the floor, so it can be reached from a wheelchair (A, 70 cm), and a floor line (B, 70 cm). These are the same length.
    4. Two floor lines, one straight across (A, 80 cm) and one slanting (B, 90 cm).
    5. The width of the teacher's table (A) and the width of a cupboard (B). Choose two things that are each shorter than the string.
    6. The width of the classroom door (A) and the width of a bookshelf (B).
- The teacher's answer key: write the answers for stations 5 and 6 after checking them with string before the lesson.
- Per pair: one piece of string about 1.5 m long, cut by an adult, and two clothes pegs.
- Per child: a recording sheet with a row per station: "A is longer", "B is longer", "the same" (words and simple pictures), to circle.
- Two picture cards for the closing check: a table with a string lying along it, just as long, and a rug with the same string lying on it, shorter than the rug.
- Per child: two small answer cards, one with a table picture and one with a rug picture.

Steps

✎ Opening (5 min)

"I want to know if this table is longer than the rug. Can I pick up the table and put it next to the rug?" (No, it is too heavy.) "In lesson 1 we lined the ends up. What could we do now?" Take ideas. Show the string: lay it along line A at station 1 with one end at the start tab, and clip a peg on the string exactly where line A ends. "Now the string remembers how long line A is." Carry it to line B.

✎ Main activity (30 min)

1. At station 1, lay the string along line B from its start tab. "Does the peg come before the end of B, at the end, or past it?" (Before the end: B is longer.) Say the reasoning aloud together: "The string is as long as A. B is longer than the string. So B is longer than A."
2. Pairs visit three or four stations. One child holds the string's end at the start tab; the other lays it along and clips the peg. They swap roles at the next station. Each child circles the answer on their sheet.
3. As you go round, ask each pair to say the reasoning sentence for one station: "The string is as long as ... . is longer / shorter / the same as the string. So ... ."
4. Stretch: "Use the string to find something in the room that is about as long as line A at station 1." (Answers vary; check by laying the string along it.)

✓ Discussion questions (with answers)

- Station 1: B is longer. Station 2: A is longer. Station 3: the same. Station 4: B is longer. Stations 5 and 6: see your key.
- "At station 3, one line is on the wall and one is on the floor. Does that change which is longer?" (No; where a line is, or which way it points, does not change its length.)
- "What would go wrong if the string's end did not start at the start tab?" (The peg would not show the real length; it is like not lining up the ends.)

✓ Closing check (5 min, with answers)

Show the two picture cards and say: "Sam's string was just as long as the table. Then Sam put the string on the rug. The string was shorter than the rug. Which is longer, the table or the rug?" Children hold up one answer card at the same time. (The rug.) Then: "If the string had been longer than the rug, which would be longer?" (The table.)

Vocabulary

compare; just as long as; the same length; longer than; shorter than; start; end

Differentiation

- Support: begin with station 1 or 4, where the difference is 10 to 20 cm; an adult can hold the start end.
- Stretch: put three lengths in order with the string: line A at station 4 and both lines at station 1. (Station 4 line A is shortest, then station 1 line A, then station 1 line B.)
- Blind or low-vision children: feel the folded start tab and the block or tape dot at the finish; feel where the peg sits against the finish.
- Wheelchair users: station 3's wall line and table lines are reachable; for floor lines, a partner lays the string while the child directs and checks the peg.
- Children who use sign or a device give the reasoning sentence that way; a partner can say it while they point to each part.

⚠ Safety

- Adults cut and hand out the string; no scissors for children.
- String goes along lines and objects only, never round fingers, wrists or necks. Collect it at the end of the lesson.
- Floor stations should be away from doors and walkways so nobody trips.

Teacher notes and misconceptions

- The lengths of stations 1 to 4 are chosen so the answers are clear (at least 10 cm apart) except station 3, where the point is that two lengths in different places can be the same.
- Some children think a slanting line is longer because it "goes further". Station 4 lets them check.
- The standards expect children to use this kind of reasoning ("if A is the same as the string and B is longer than the string, B is longer than A") without learning a name for it.

Lesson 3: Measuring with equal units

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 40 minutes.

Goal

Children measure a length by laying equal units end to end, with no gaps and no overlaps, and say the length as a number of units.

Materials

- Per pair: 30 linking cubes all the same size (the cubes from term 2).
- Per pair: 10 unit cards: identical card rectangles, each exactly as long as two cubes joined together.
- Per pair: three card strips to measure, cut to exactly 6, 8 and 10 cubes long and labelled with a letter and raised dots (P, one dot; Q, two dots; R, three dots).
- A tray with three demonstration strips measured wrongly: one with a gap between two cubes, one with two cubes overlapping (one cube pushed partly on top of another), and one with cubes and unit cards mixed; and a fourth strip measured correctly with cubes, for the closing check.
- Per child: a recording sheet with a row for each strip: "Strip P is ... cubes long" and "Strip P is ... unit cards long".

Steps

✎ Opening (5 min)

Lay a strip on the table and put loose cubes along it with gaps between them. "I counted 4 cubes, so it is 4 cubes long. Do you agree?" Take ideas. Push the cubes together with no gaps, and keep adding cubes until they reach the end. Count again. Agree the rules: **start at one end, no gaps, no overlaps, all the units the same size, stop at the other end.**

✎ Main activity (30 min)

1. Pairs measure strips P, Q and R with cubes. One child lays the cubes from the start end; the other checks for gaps and overlaps and counts. Swap for each strip. Children write or say the number (P 6, Q 8, R 10).
2. Pairs measure the same strips with unit cards (P 3, Q 4, R 5).
3. Show the tray. For each demonstration strip, ask: "What went wrong? Will the count be too big or too small?" (Gap: some of the strip is not covered, so the count is too small. Overlap: two units share the same bit of strip, so the count is too big. Mixed units: the number does not tell us how long, because the units are not the same.)

4. Stretch: "Strip R is 10 cubes long but only 5 unit cards long. Why are the numbers different?" (A unit card is as long as two cubes, so you need fewer of them.) Or: lay P, Q and R end to end and measure all three together (24 cubes).

✓ Discussion questions (with answers)

- "Strip Q is 8 cubes long. If Ali counts 7, what might have happened?" (A gap, or Ali did not start at the end.)
- "If Ben counts 9, what might have happened?" (An overlap, or a cube past the end.)
- "Could we measure with a cube and a pencil and a crayon?" (No; the units must all be the same size, or the number does not mean anything.)

✓ Closing check (5 min, with answers)

Hold up each demonstration strip from the tray, one at a time, and a fourth strip measured correctly. Children show thumbs up (measured right) or thumbs down (measured wrong) at the same time. (Gap: down. Overlap: down. Mixed: down. Correct: up.) Then ask one child to say what was wrong with the gap strip. (It has a gap, so the count is too small.)

Vocabulary

measure; unit; end to end; gap; overlap; the same size; how long

Differentiation

- Support: measure strip P only, then Q; place a line on the strip where each cube should go (6 boxes drawn on strip P).
- Stretch: the two stretch questions above.
- Blind or low-vision children: feel along the strip for gaps between cubes, and feel that the last cube ends at the strip's end; linking the cubes together removes gaps.
- Children who cannot use their fingers easily can direct a partner ("one more, push it closer") and check by looking or touching with a palm.
- Children who do not use thumbs can hold up a "yes" or "no" card, or nod or shake their head, for the closing check.

⚠ Safety

Collect loose cubes from the floor; nobody should step on them.

Teacher notes and misconceptions

- The strips are cut so they are exactly a whole number of units long; the standard limits grade 1 measuring to this.
- Linking the cubes into a train is a good way to avoid gaps. Some children count the cubes before they have reached the end; ask them to run a finger along to check.

- Comparing cube counts with unit-card counts is a stretch, not an outcome.

Lesson 4: What makes a triangle a triangle?

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 40 minutes.

Goal

Children decide whether a shape is a triangle, square or rectangle by its sides and corners, not by its colour, size or which way it is turned, and build these shapes with craft sticks.

Materials

- Per pair: a set of 24 shape cards cut from card (so the edges can be felt): 8 triangles of different sizes, colours and turns (including long thin ones and upside-down ones); 4 squares; 4 rectangles that are not squares; and 8 "not quite" shapes: a three-sided shape with a gap at one corner, a three-sided shape with one curved side, a four-sided shape that is not a rectangle, a circle, a half-circle, and three shapes with more than four sides.
- Per pair: a sorting mat with two areas labelled "triangle" and "not a triangle" (the words, a drawn triangle and a raised outline of a triangle).
- Four large shape cards for the closing check: an upside-down triangle, a three-sided shape with a gap, a big red triangle, and a three-sided shape with one curved side; a hand-sized copy of each of these four, and a small blue triangle, for the opening and for children who check by touch.
- Per child: 8 craft sticks (checked for splinters), a whiteboard and pen.

Steps

✎ Opening (5 min)

Hold up the big red triangle card, then turn it upside down. "Is it still a triangle?" Then the small blue triangle. "Is this a triangle?" Agree that colour, size and turning do not change what shape it is. Ask: "So what does make a triangle?" Collect ideas and agree on: **closed (no gaps), three straight sides, three corners.**

✎ Main activity (30 min)

1. Pairs sort their shape cards onto the mat: triangle or not a triangle. For each "not a triangle" card with three sides, they say why. (Gap: not closed. Curved side: not all sides straight.)
2. Take the squares and rectangles out of the "not a triangle" pile. Count sides and feel the corners. "Both have four straight sides and four square corners. A square's sides are all the same length." Pairs sort them into squares and rectangles.
3. Building: each child makes a triangle with 3 craft sticks, then a square with 4. "Can you make a rectangle that is not a square?" (Use 6 sticks: two sticks end to end for each long side, one stick for each short side.) Children check each other's shapes against the rules.

4. Children draw one triangle and one rectangle on their whiteboard and show a partner.
5. Stretch: "Make the biggest triangle you can with all 8 sticks." Or: "Draw a triangle that nobody else in the class will draw." (Any closed shape with three straight sides counts.)

✓ Discussion questions (with answers)

- "Mia says this long thin shape is not a triangle because it is too thin. Is she right?" (No: it is closed and has three straight sides, so it is a triangle.)
- "Is a square turned on its corner still a square?" (Yes; turning does not change the shape.)
- "Why is the shape with a gap not a triangle?" (It is not closed.)

✓ Closing check (5 min, with answers)

Hold up the four large closing-check cards, one at a time, and leave them in a row. Each child writes on their whiteboard how many of the four are triangles and everyone holds up together. (2: the upside-down triangle and the big red triangle.) Ask one child why the curved one is not a triangle. (One side is not straight.)

Vocabulary

triangle; square; rectangle; side; corner; straight; curved; closed; turned

Differentiation

- Support: sort only triangles and circles first, then add the "not quite" shapes.
- Stretch: the two stretch tasks above.
- Blind or low-vision children: feel along each edge for straight or curved sides and count corners by touch; the gap shape has a clear gap to feel. For the closing check, give them a hand-sized copy of each card to feel.
- Children who cannot hold craft sticks easily can direct a partner by pointing to where each stick goes.
- Children who cannot write a number can hold up fingers, point to a number card, or sign.
- Colour is never the clue to a shape's name.

⚠ Safety

Check craft sticks for splinters before the lesson; collect them afterwards.

Teacher notes and misconceptions

- Children often think a triangle must have a flat bottom and a point at the top, because that is how pictures usually show it. Many turned and thin triangles in the card set help.
- A square is a special kind of rectangle (it has four square corners). Some classes say this in grade 1 and some leave it for later; it is not assessed in this unit.

Lesson 5: Putting shapes together

Unit overview - Previous: Lesson 4

About 40 minutes.

Goal

Children put two or more shapes together to make a new shape, then use that new shape to make a bigger one.

Materials

- Per pair: a bag of card shapes: 8 right-angled triangles (the two sides next to the square corner are each 5 cm), 4 squares (5 cm sides), 2 rectangles (5 cm by 10 cm), 4 half-circles (10 cm across) and 4 quarter-circles (5 cm radius).
- Per pair: 6 outline cards, each with a shape drawn full size and its outline raised (glue line or wool) so it can be felt:
    1. a square, 5 cm sides;
    2. a rectangle, 5 cm by 10 cm;
    3. a circle, 10 cm across;
    4. a trapezoid, 15 cm along the bottom, 5 cm along the top, 5 cm high;
    5. a big right-angled triangle, 10 cm along each side next to the square corner;
    6. a big square, 10 cm sides.
- Per child: a blank sheet and a pencil, for drawing round a design.
- Per child: a whiteboard and pen (as in lesson 4), for the closing check.
- One set of the card shapes, larger, for the teacher to show (or a visualiser).

Steps

✎ Opening (5 min)

Show two triangles. "What shape could these two triangles make if I put them together?" Take guesses, then put the long sides together: a square. Then: "Two of these squares?" (A rectangle.) "Now we have made a rectangle out of triangles and a square. We made a new shape from a shape we had already made."

✎ Main activity (30 min)

1. Pairs fill outline cards 1, 2 and 3 with shapes from the bag, so that the shapes cover the outline with no gaps and no overlaps. They say which shapes they used.
2. Then cards 4, 5 and 6. Encourage more than one way for each card.
3. Free building: each child makes their own picture or pattern from at least four shapes and draws round it on their sheet. Partners say one shape they can see that was made from two smaller shapes.
4. Opt-in share: children who want to can show their design to the class. Nobody has to.

5. Stretch: "Make a big square from triangles only. How many triangles do you need?" (8 for card 6.) "Make a circle from quarter-circles. How many?" (4.)

✓ Discussion questions (with answers)

Answer key for the outline cards (other correct ways count too; check with the shapes):

- Card 1 square: 2 triangles (or 1 square).
- Card 2 rectangle: 2 squares, 4 triangles, 2 triangles and 1 square, or 1 rectangle.
- Card 3 circle: 2 half-circles, or 4 quarter-circles, or 1 half-circle and 2 quarter-circles.
- Card 4 trapezoid: 1 square in the middle with a triangle on each side, or 4 triangles.
- Card 5 big triangle: 4 triangles, or 1 square and 2 triangles.
- Card 6 big square: 4 squares, 2 rectangles, 8 triangles, or a mix (for example 1 rectangle and 2 squares).
- "Two half-circles make a circle. What do two quarter-circles make?" (A half-circle.)

✓ Closing check (5 min, with answers)

Show outline card 1 and two triangles. "How many triangles fill this square?" Children write the number on a whiteboard, or hold up fingers, at the same time. (2.) Then show outline card 6: "How many small squares fill this big square?" (4.)

Vocabulary

put together; make; new shape; square; rectangle; triangle; trapezoid; half-circle; quarter-circle; circle; no gaps, no overlaps

Differentiation

- Support: start with cards 1 and 3, with the shapes needed set out beside the card.
- Stretch: the two stretch questions above; or make a shape and give a partner its outline to fill.
- Blind or low-vision children: feel the raised outline, then fit shapes inside it by touch; edges of card shapes can be felt meeting.
- Children who cannot place shapes easily can point to where each shape goes while a partner places it, or move shapes by sliding them with a palm.
- The free design is shared only if the child wants to.

⚠ Safety

Card shapes only; no small pieces that need picking up from the floor beyond the usual tidy-up.

Teacher notes and misconceptions

- Some children turn a shape the wrong way and decide "it doesn't fit". Encourage turning and flipping.
- The trapezoid is named here because it appears in the source's list of shapes; children do not need to define it.

Grade 2 Mathematics: Adding and Taking Away Within 100 (5 lessons, about 4 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 10 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 1. Builds on grade 1: Adding and taking away within 20 and Tens and ones to 100

Big idea

Two-digit numbers are tens and ones, so we can add or take away tens with tens and ones with ones. Sometimes ten ones join to make a new ten, and sometimes a ten has to be broken into ten ones. Adding and taking away undo each other, so one can check the other. A drawing with a box for the unknown helps us see what a story problem is asking, even when it has two steps.

Outcomes

By the end of the unit most children can:

1. Add and take away within 20 quickly using a strategy they can name (doubles, near doubles, making ten, or "what do I add?").
2. Add two two-digit numbers by adding tens and tens and ones and ones, using cubes, drawings or the hundred square, including sums where the ones make a new ten (38 + 25 = 63).
3. Take away a two-digit number from a two-digit number, including when a ten has to be broken into ones (52 - 17 = 35), and check the answer by adding.
4. Explain with cubes or a drawing why their method works ("8 ones and 5 ones are 13 ones, which is 1 ten and 3 ones").
5. Solve one-step story problems within 100 of the five kinds (adding to, taking from, putting together, taking apart, comparing), and two-step story problems, using a drawing and a number sentence with a box for the unknown.

Prior knowledge

The grade 1 units: facts within 20 with strategies (fluency within 10 only), tens and ones to 100, 10 more and 10 less, adding a one-digit number or a multiple of ten to a two-digit number. Children still building these can work with numbers to 50, or with sums that do not make a new ten, in every lesson.

Lessons

Each lesson is about 45 minutes: a short whole-class start, paired work with cubes, and a closing check. Split a lesson over two days if needed; the unit runs over about 4 weeks, so each method should come back in short daily practice (5 minutes of quick facts or one story problem).

1. Facts within 20: checking and speeding up
2. Adding tens and ones
3. Adding when the ones make a new ten
4. Taking away, breaking a ten, and checking by adding
5. One-step and two-step story problems

Materials (whole class unless noted)

- Linking cubes too large to swallow, per pair: 10 towers of ten and 20 loose cubes (lessons 2 to 5). Straw bundles of ten wrapped with tape (no rubber bands, which may contain latex) work as well.
- Two ten-frames and 20 counters per child (lesson 1), in two colours or two kinds of object so colour is not the only clue.
- A tens-and-ones mat per pair: a sheet with a left column for tens and a right column for ones, with a raised line (glued string) between them (lessons 2 to 5).
- A 1 to 100 hundred square per pair, in large print, with optional raised lines between rows (lessons 2 and 4); one large hundred square for the board.
- Fact cards and four strategy cards (double, near double, make ten, what do I add?) per pair for lesson 1 (see lesson 1).
- Optional: a cup marked "ten" per pair (lesson 3, for children who slide ten loose cubes into it instead of snapping), and egg boxes or a 2 by 5 grid of cups for tactile ten-frames (lesson 1).
- Two sets of digit cards 0 to 9 per pair, so children can build and point to two-digit answers (every lesson).
- Story-problem cards for lesson 5 (see lesson 5), with a small picture on each card.
- Whiteboards and pens, or paper and pencils, for drawings and number sentences.

⚠ Safety and access

- Use cubes and counters too large to swallow; no rubber bands.
- Cube towers and the raised line on the mat let children who are blind or have low vision feel tens and ones; large-print or tactile hundred squares help too.
- Pointing to digit cards, moving cubes, sign, writing or a communication device all count as answers. Story problems are read aloud, so reading is not what is being checked.
- No public timing or races. "Quick" means without counting all from 1, in the child's own way.

Assessment

Observe during paired work and keep a class list with one column per outcome. A one-to-one check (about 5 minutes per child) during the fourth week:

- "What is 8 + 7? How did you work it out?" (15; for example 7 + 7 + 1, or 8 + 2 + 5.) "What is 13 - 5?" (8; for example "5 and what make 13?")

- "What is 43 + 25?" (68: 4 tens and 2 tens are 6 tens, 3 ones and 5 ones are 8 ones.)
- "What is 37 + 48? Show me with cubes or a drawing." (85: 7 ones and 8 ones are 15 ones, which is 1 ten and 5 ones, so 3 + 4 + 1 = 8 tens and 5 ones.)
- "What is 62 - 27? How can you check?" (35: break a ten so there are 5 tens and 12 ones, take 2 tens and 7 ones, leaving 3 tens and 5 ones; check 35 + 27 = 62.)
- "56 leaves were on a branch. The wind blew some away. Now there are 29. How many blew away?" (27; 29 + □ = 56 or 56 - 29 = □.)
- "Duck had 18 pebbles. Duck found 20 more, then gave 9 to Hen. How many pebbles does Duck have now?" (29: 18 + 20 = 38, then 38 - 9 = 29.)

Record yes, with help or not yet for each part. A child who answers correctly by counting in ones has the answer but not yet the tens-and-ones method; note that rather than marking it wrong.

Sources

- Common Core State Standards, Grade 2 Operations and Algebraic Thinking (read to check what is usually expected in grade 2, not to claim alignment): https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/2/OA/
    - 2.OA.A.1 one- and two-step word problems within 100 involving adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions, using drawings and equations with a symbol for the unknown; 2.OA.B.2 fluently add and subtract within 20 using mental strategies, and by the end of grade 2 know from memory all sums of two one-digit numbers.
- Common Core, Grade 2 Number and Operations in Base Ten: https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/2/NBT/
    - 2.NBT.B.5 fluently add and subtract within 100 using strategies based on place value, properties of operations and the relationship between addition and subtraction; 2.NBT.B.6 add up to four two-digit numbers (lesson 3 stretch only); 2.NBT.B.9 explain why addition and subtraction strategies work, using place value (explanations may be supported by drawings or objects).
- Common Core, Grade 2 introduction (its critical areas include fluency with addition and subtraction within 100): https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/2/introduction/

Known gaps and cautions

- Peer check: Gemini 4 Argon did a script-verified text check at 6e0e80a (keys, working, timings and links; as reported, not an educator or accessibility review) and reported 0 errors (see PEERCHECKS.md).
- Knowing all sums of two one-digit numbers from memory is an end-of-year aim in the source; this unit starts that work, and the daily quick-facts practice should continue all year.
- Odd and even numbers and adding equal groups (2.OA.C.3, 2.OA.C.4) are left for term 2, where the year plan puts equal groups. Three-digit numbers and adding within 1000 are also term 2.
- Problems with the unknown at the start ("Some stamps... now there are 60") are the hardest kind and appear in lesson 5 as a stretch task.
- A written column method is not taught. Children record tens and ones in their own way (drawings of towers and cubes, or splitting numbers into tens and ones); a written method can follow once the meaning is secure.

- The names in story problems (Remy, Duck, Hen, Mouse, Goat, Bear) are the made-up Little Hill characters used in other units. Swap in names and objects that suit your class, but avoid real children's belongings or families.
- The lesson order, timings and examples are my choice, not taken from a source.

Lesson 1: Facts within 20: checking and speeding up

Unit overview - Next: Lesson 2

About 45 minutes.

Goal

Children recall the grade 1 strategies for facts within 20 (doubles, near doubles, making ten, "what do I add?"), choose one for a given fact, and start answering more facts without counting all from 1.

Materials

- Two ten-frames and 20 counters per child, in two colours or two kinds of object.
- Fact cards per pair: 12 cards, each with one fact on it: 6 + 6, 7 + 8, 9 + 5, 8 + 6, 5 + 6, 9 + 9, 13 - 4, 15 - 8, 12 - 9, 17 - 8, 14 - 7, 11 - 3. Write the answer small on the back.
- Four strategy cards per pair, each with a word and a picture: double (two equal towers), near double (two towers, one cube taller), make ten (a full ten-frame), what do I add? (a question mark).
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Pairs to ten. Show 6 on a ten-frame. "How many more make 10?" (4.) Repeat with 3 (7), 8 (2), 1 (9) and 5 (5). Children answer with fingers, counters or digit cards.

✎ Main activity (32 min)

1. **Remember the strategies (10 min).** Work one fact of each kind on the board with ten-frames:
   - 7 + 7 = 14 (double).
   - 7 + 8 = 7 + 7 + 1 = 15 (near double).
   - 9 + 6: move 1 counter across to fill the first frame, so 10 + 5 = 15 (make ten).
   - 13 - 9: "9 and what make 13?" 9 + 1 = 10, then 3 more, so 4 (what do I add?).
2. **Sort the facts (12 min).** Pairs lay out the four strategy cards and put each fact card under the strategy they would use, then work it out and check the back. More than one place can be right (8 + 6 can be a near double, 7 + 7, or make ten, 8 + 2 + 4). Answers: 6 + 6 = 12, 7 + 8 = 15, 9 + 5 = 14, 8 + 6 = 14, 5 + 6 = 11, 9 + 9 = 18, 13 - 4 = 9, 15 - 8 = 7, 12 - 9 = 3, 17 - 8 = 9, 14 - 7 = 7, 11 - 3 = 8.
3. **Quick facts game (10 min).** Pairs shuffle the fact cards face down. One child turns a card and answers in their own way; the partner checks the back. If the answer took a

long count, the pair talks about which strategy would be quicker next time. Swap after each card. No timing and no scores.

✓ Discussion questions (with answers)

- Why is 7 + 8 easy if you know 7 + 7? 8 is one more than 7, so the answer is one more than 14: 15.
- For 12 - 9, why is "what do I add?" quicker than counting back 9? 9 is close to 12; adding up from 9 to 12 is just 3 steps.
- Can a fact belong to more than one strategy? Yes; any strategy that gives the right answer works.

✓ Closing check (8 min, with answers)

Each child answers on a whiteboard, with digit cards or by pointing: "7 + 8" (15), "14 - 6" (8; 6 and 8 make 14), "9 + 6" (15). Then one child at a time quietly tells the teacher which strategy they used for one of the three.

Vocabulary

double, near double, make ten, fact, strategy

Differentiation

- **Support:** stay with doubles and make ten for sums to 14, using ten-frames.
- **Stretch:** make a fact card of your own for each strategy, and explain why 6 + 8 can be solved as a double of 7 (take 1 from 8 and give it to 6: 7 + 7 = 14).
- Ten-frames can be made tactile (counters in an egg box or a 2 by 5 grid of cups). Fact cards can be read aloud by the partner or made in large print or braille.

⚠ Safety

Use counters too large to swallow.

Teacher notes and misconceptions

- Some children still count all from 1. That is fine in this lesson; note who does, and give them daily make-ten and doubles practice.
- "What do I add?" is a way to think about a take-away, not a different operation. Saying both ("13 take away 9 is 4, because 9 and 4 make 13") helps.

Lesson 2: Adding tens and ones

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 45 minutes.

Goal

Children add two two-digit numbers where the ones do not make a new ten, by adding tens with tens and ones with ones, using cubes, a tens-and-ones mat and the hundred square.

Materials

- Per pair: 10 towers of ten linking cubes, 20 loose cubes, a tens-and-ones mat and a hundred square.
- A large hundred square for the board.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

10 more and 10 less. Point to 47 on the big hundred square. "What is 10 more?" (57, the square below.) "10 less?" (37, the square above.) Repeat with 62 (72, 52) and 18 (28, 8).

✎ Main activity (30 min)

1. **Build both numbers (10 min).** On the board: 34 + 25. Build 34 (3 towers, 4 loose cubes) and 25 (2 towers, 5 loose) on the mat, towers on the tens side and loose cubes on the ones side. "Tens with tens: 3 tens and 2 tens are 5 tens. Ones with ones: 4 and 5 are 9. 5 tens and 9 ones is 59." Pairs build and add:
    - 42 + 36 (78)
    - 51 + 27 (78)
    - 23 + 45 (68)
2. **Hundred square jumps (10 min).** Show 34 + 25 on the big hundred square: start at 34, jump down 2 rows for 2 tens (44, 54), then 5 squares along for 5 ones (55, 56, 57, 58, 59). Pairs use their own squares for 23 + 45 and check it matches the cubes (68). Then 60 + 38 (98: start at 60, jump down 3 rows to 90, then 8 along to 98).
3. **Record it your own way (10 min).** Children write or draw one of their sums: drawings of towers and cubes, or splitting into tens and ones (34 + 25: 30 + 20 = 50, 4 + 5 = 9, 50 + 9 = 59). Any clear record counts.

✓ Discussion questions (with answers)

- Why do we put tens with tens and ones with ones? They are different sizes; 5 tens and 9 ones is 59, but adding 3 to 5 as if both were ones would give the wrong number.
- On the hundred square, why does jumping down one row add 10? Each row has ten squares, so the square below is always 10 more.
- Does 25 + 34 give the same answer as 34 + 25? Yes, 59; the order does not change the total.

✓ Closing check (10 min, with answers)

"Show me 32 + 46 with cubes or on the hundred square, then show the answer with digit cards." (78.) Then "14 + 53." (67.) Note who adds tens and ones and who counts every cube in ones.

Vocabulary

tens, ones, tower, loose cubes, hundred square, row

Differentiation

- **Support:** add a multiple of ten first (34 + 20 = 54), then a two-digit number with small ones (34 + 21 = 55).
- **Stretch:** find two different pairs of two-digit numbers that add to 79 without making a new ten (for example 45 + 34 and 23 + 56).
- Children who are blind or have low vision can feel the towers and loose cubes on either side of the raised line on the mat; the hundred square can be a large-print or tactile copy, or skipped in favour of cubes.

⚠ Safety

Use cubes too large to swallow.

Teacher notes and misconceptions

- Some children add all four digits together (3 + 4 + 2 + 5 = 14). Building with towers and loose cubes shows why that does not work.
- Keep to sums where the ones total 9 or less in this lesson; lesson 3 deals with making a new ten.

Lesson 3: Adding when the ones make a new ten

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 45 minutes.

Goal

Children add two two-digit numbers where the ones make a new ten, by joining ten loose cubes into a tower, and explain why the tens go up by one.

Materials

- Per pair: 10 towers of ten linking cubes, 20 loose cubes and a tens-and-ones mat.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Make ten with loose cubes. Show 8 loose cubes and 5 loose cubes. "How many ones? Can we make a ten?" (13 ones: snap 10 into a tower, leaving 3, so 1 ten and 3 ones.) Repeat with 7 and 6 (13: 1 ten and 3 ones) and 9 and 9 (18: 1 ten and 8 ones).

✎ Main activity (30 min)

1. **A new ten (12 min).** On the board: 38 + 25. Build both numbers on the mat. "Tens: 3 and 2 are 5 tens. Ones: 8 and 5 are 13 ones. That is too many to leave loose: snap 10 of them into a tower and move it to the tens side. Now 6 tens and 3 ones: 63." Pairs build and add:
    - 47 + 26 (73)
    - 29 + 34 (63)
    - 56 + 18 (74)
2. **Say why (8 min).** Each pair explains one sum to another pair using the cubes: "7 ones and 6 ones are 13 ones. 10 ones make a new ten, so there are 4 + 2 + 1 = 7 tens and 3 ones: 73."
3. **Ones exactly ten (10 min).** 45 + 45. Ones: 5 and 5 are 10, which makes a whole new ten with no loose ones left. Tens: 4 + 4 + 1 = 9 tens, 0 ones:
4. Pairs try 36 + 24 (60) and 17 + 53 (70), then record one sum in their own way.

✓ Discussion questions (with answers)

- Why does the tens number go up by one in 38 + 25? The 13 ones contain a full ten, which joins the other tens.

- Why is 45 + 45 not "8 tens and 10 ones"? 10 ones is the same as 1 ten, so we write it as 9 tens and 0 ones: 90.
- How can you tell before adding whether the ones will make a new ten? If the two ones digits add to 10 or more.

✓ Closing check (10 min, with answers)

"Show me 27 + 35 with cubes or a drawing and tell me or a partner what happened to the ones." (62: 7 and 5 are 12 ones, a new ten and 2 ones, so 2 + 3 + 1 = 6 tens and 2 ones.) Then, with digit cards, "48 + 16." (64.)

Vocabulary

new ten, snap, too many ones, exchange

Differentiation

- **Support:** start with a two-digit number plus a one-digit number that makes a new ten (27 + 5 = 32, as in grade 1), then 27 + 15.
- **Stretch:** add four two-digit numbers by finding friendly pairs: 12 + 30 + 18 + 20 (12 + 18 = 30, then 30 + 30 + 20 = 80).
- Children who cannot snap cubes can slide ten loose cubes into a cup marked "ten" instead; an adult or partner can build while the child directs.

⚠ Safety

Use cubes too large to swallow.

Teacher notes and misconceptions

- A common error is writing 513 for 38 + 25 (5 tens, then 13 ones). Ask "Is this more than 100? Is that sensible?" and rebuild with cubes.
- "Exchange" is optional vocabulary; "snap ten ones into a ten" is enough.

Lesson 4: Taking away, breaking a ten, and checking by adding

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 45 minutes.

Goal

Children take away a two-digit number from a two-digit number, break a ten into ten ones when there are not enough ones, check by adding, and count up when the two numbers are close.

Materials

- Per pair: 10 towers of ten linking cubes, 20 loose cubes, a tens-and-ones mat and a hundred square.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Take away tens. "70 - 30?" (40.) "85 - 20?" (65.) "56 - 10?" (46.) Children use towers or the hundred square (jump up a row for each ten).

✎ Main activity (32 min)

1. **Enough ones (7 min).** 68 - 25: build 68, take away 2 towers and 5 loose cubes, leaving 4 towers and 3 cubes: 43. Pairs try 79 - 34 (45).
2. **Breaking a ten (12 min).** 52 - 17: build 52 (5 towers, 2 loose). "We need to take 7 ones but have only 2. Break one tower into 10 loose cubes: now 4 tens and 12 ones. Take 7 ones: 5 left. Take 1 ten: 3 tens left. 3 tens and 5 ones: 35." Pairs try:
    - 43 - 18 (25)
    - 60 - 24 (36: break a tower, so 5 tens and 10 ones; take 4 ones, leaving 6; take 2 tens, leaving 3)
3. **Check by adding (6 min).** "If 52 - 17 = 35, then 35 + 17 should be 52." Pairs put the 35 and the 17 back together with cubes (35 + 17 = 52, a new ten made from 5 and 7 ones), then check 25 + 18 = 43 and 36 + 24 = 60.
4. **Close numbers: count up (7 min).** 61 - 58: taking away 58 cubes is slow. "58 and what make 61?" On the hundred square: 58 to 60 is 2, 60 to 61 is 1, so 3. Pairs try 72 - 69 (3) and 40 - 37 (3).

✓ Discussion questions (with answers)

- Why do we break a ten in 52 - 17? There are only 2 ones and we need to take 7; one ten becomes 10 ones, giving 12.
- How does adding check a take-away? If we put back what we took away, we should get the number we started with.
- When is counting up quicker than taking away? When the two numbers are close together, like 61 and 58.

✓ Closing check (8 min, with answers)

"Show me 54 - 28 with cubes or a drawing, then check it by adding." (26: break a ten so there are 4 tens and 14 ones; take 8 ones, leaving 6; take 2 tens, leaving 2 tens; check 26 + 28 = 54.) Answer with digit cards, cubes, words or a drawing.

Vocabulary

take away, break a ten, check, count up, difference

Differentiation

- **Support:** stay with take-aways that need no breaking (68 - 25), then a one-digit number that needs breaking (32 - 5 = 27).
- **Stretch:** explain why 50 - 26 and 54 - 30 give the same answer (24 both times: adding 4 to both numbers keeps the difference the same).
- An adult or partner can break and move towers while the child directs; a child can answer by pointing to digit cards.

⚠ Safety

Use cubes too large to swallow.

Teacher notes and misconceptions

- The most common error is taking the smaller ones digit from the larger (52 - 17 giving 45, because "7 take away 2 is 5"). Building 52 and trying to take 7 loose cubes shows why that does not work.
- Keep "borrowing" out of the language; "break a ten into ten ones" says what happens.

Lesson 5: One-step and two-step story problems

Unit overview - Previous: Lesson 4

About 45 minutes.

Goal

Children solve one-step story problems within 100 of the five kinds and two-step story problems, by drawing the story and writing a number sentence with a box for the unknown.

Materials

- Story-problem cards (one set per pair; the problems are in the steps below), each with a small picture, read aloud by the teacher or a partner.
- Per pair: 10 towers of ten linking cubes, 20 loose cubes and a tens-and-ones mat.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Quick facts from lesson 1: "8 + 5?" (13.) "16 - 9?" (7.) "6 + 7?" (13.)

✎ Main activity (32 min)

1. **Draw the story (10 min).** Read: "Remy had 36 shells and found 27 more. How many shells now?" Draw a long bar split into two parts, 36 and 27, with a box above the whole bar. Write 36 + 27 = □. Solve with cubes or tens and ones (63). Then: "The Little Hill shop had 54 apples. Some were sold. Now there are 38. How many were sold?" Draw a bar for 54 split into 38 and a box. Write 38 + □ = 54 or 54 - 38 = □ (16).
2. **Problem cards (14 min).** Pairs read each card (or have it read to them), draw the story, write a number sentence with a box, and solve:
    - "45 boats are in the harbour. 28 are red and the rest are blue. How many are blue?" (17; 28 + □ = 45.)
    - "Hen has 62 seeds. Mouse has 25 fewer seeds than Hen. How many seeds does Mouse have?" (37; 62 - 25 = □.)
    - "Goat picked 71 apples and Duck picked 48. How many more did Goat pick?" (23; 48 + □ = 71.)
    - Stretch: "Bear had some stamps. Bear got 25 more. Now Bear has 60. How many stamps did Bear have at the start?" (35; □ + 25 = 60.)
3. **Two steps (8 min).** "Bear had 40 berries, ate 12, then picked 25 more. How many berries now?" Draw two steps: 40 - 12 = 28, then 28 + 25 = 53. Pairs try: "23 people

are on the Little Hill bus. 15 get on and 9 get off. How many are on the bus now?" (29: 23 + 15 = 38, then 38 - 9 = 29.)

✓ Discussion questions (with answers)

- In the apple problem, why can we add or take away? The 38 apples left and the apples sold make the 54 we started with; 38 + □ = 54 and 54 - 38 = □ find the same missing part.
- "Mouse has 25 fewer" has the word "fewer". Do we add or take away? Take away: Mouse has less than Hen, so 62 - 25.
- How do you know a problem has two steps? Two things happen, one after the other, and we need the first answer to do the second.

✓ Closing check (8 min, with answers)

Read aloud: "Duck had 34 pebbles and found 19 more. Then Duck gave 20 to Hen. How many pebbles does Duck have now?" Children draw the story and answer with digit cards, cubes, words or a drawing. (33: 34 + 19 = 53, then 53 - 20 = 33.)

Vocabulary

story problem, bar, part, whole, unknown, fewer, more than, two steps

Differentiation

- **Support:** one-step problems with numbers to 50 that do not make or break a ten; act the story out with cubes before drawing.
- **Stretch:** write a two-step story problem for a partner, with the answer on the back.
- Story cards can be in large print or braille, read aloud, or acted with objects; the bar can be built from cube towers instead of drawn. Answers can be given by pointing or with a communication device.

⚠ Safety

Use cubes too large to swallow.

Teacher notes and misconceptions

- Key words can mislead: "more" appears in "How many more did Goat pick?", which is a take-away or missing-part problem. Drawing the story is more reliable than hunting for words.
- The bar drawing is one way to show a story; any drawing that shows the parts and the whole works.

Grade 2 Mathematics: Hundreds, Tens and Ones to 1000 (5 lessons, about 4 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 10 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 2. Builds on grade 1: Tens and ones to 100 and grade 2 term 1: Adding and taking away within 100

Big idea

Ten ones make a ten, and ten tens make a hundred. The three digits of a number like 243 tell us how many hundreds, tens and ones there are, and a zero means "none of these". Because of this, we can compare numbers by looking at the hundreds first, and we can add or take away 10 or 100 by changing just one digit. Some numbers of things can be shared into pairs with none left over (even) and some cannot (odd), and things set out in equal rows can be counted by adding the rows.

Outcomes

By the end of the unit most children can:

1. Show that 100 is ten tens, and that 100, 200, 300 and so on up to 900 are one, two, three and so on up to nine hundreds, with no tens and no ones.
2. Build, read and write three-digit numbers as numerals, as number names and as hundreds, tens and ones (243 = 200 + 40 + 3), including numbers with a zero (706 is 7 hundreds, 0 tens and 6 ones).
3. Count on within 1000, including across a hundred (198, 199, 200, 201), and count in fives, tens and hundreds from different starting numbers.
4. Compare two three-digit numbers by looking at the hundreds, then the tens, then the ones, and record the result with >, = or <.
5. Say 10 more, 10 less, 100 more and 100 less than a number from 100 to 900 in their heads, and add or take away whole hundreds (300 + 400 = 700) or whole tens (570 - 40 = 530) when no new ten or hundred is made.
6. Tell whether a group of up to 20 objects is odd or even by pairing them, write an even number as a double (14 = 7 + 7), and find the total of an array of up to 5 rows and 5 columns by adding equal rows (4 + 4 + 4 = 12).

Prior knowledge

The grade 1 unit on tens and ones to 100 (tens and ones, comparing two-digit numbers with >, = and <, 10 more and 10 less) and the grade 2 term 1 unit on adding and taking away within 100. Children who are still building two-digit place value can work with hundreds and tens only (300, 340) before adding ones, in every lesson.

Lessons

Each lesson is about 45 minutes: a short whole-class start, paired work with cubes and hundred cards, and a closing check. Split a lesson over two days if needed; the unit runs over about 4 weeks, so counting in fives, tens and hundreds should come back in short daily practice (5 minutes).

1. Ten tens make a hundred
2. Hundreds, tens and ones
3. Counting in fives, tens and hundreds, and comparing
4. 10 more, 10 less, 100 more, 100 less
5. Odd and even, and equal rows

Materials (whole class unless noted)

- Linking cubes too large to swallow, per pair: 10 towers of ten and 20 loose cubes (lessons 1 to 4), as in term 1. Straw bundles of ten wrapped with tape (no rubber bands, which may contain latex) work as well.
- Hundred cards, per pair: 9 squares of card, each the size of ten towers laid side by side, with a 10 by 10 grid drawn on and the grid lines raised with glued string or thick glue so they can be felt (lessons 1 to 4). Ten extra hundred cards for the class (lesson 1).
- A hundreds-tens-ones mat per pair: a sheet with three columns labelled hundreds, tens and ones, with raised lines (glued string) between them (lessons 2 to 4).
- Three sets of digit cards 0 to 9 per pair, so children can build and point to three-digit numbers (lessons 2 to 4).
- Number-name word cards per pair, in large print: one to nine, ten to nineteen, twenty, thirty, forty, fifty, sixty, seventy, eighty, ninety, and hundred (lesson 2).
- Symbol cards >, = and < per pair, large enough to feel the shape (lessons 3 and 4).
- A large number line from 0 to 1000 marked in hundreds, for the board (lessons 3 and 4).
- A counting-in-tens chart for the board and one large-print copy per pair: ten rows, 10 to 100 in the first row, 110 to 200 in the second, and so on to 910 to 1000, with optional raised lines between rows (lesson 4).
- Hen's seed shop picture cards: a loose seed, a packet of 10 seeds and a box of 100 seeds (10 packets), plus order cards (lessons 1 and 2; see lesson 1).
- 20 counters per child, and a squared mat (a sheet ruled into 5 rows of 5 squares, with raised lines) per child (lesson 5).
- Whiteboards and pens, or paper and pencils.

⚠ Safety and access

- Use cubes and counters too large to swallow; no rubber bands.
- Towers, raised grid lines on the hundred cards and raised column lines on the mat let children who are blind or have low vision feel hundreds, tens and ones. Large-print or braille digit cards help children who read them.
- Pointing to digit cards, moving cubes and cards, sign, writing or a communication device all count as answers. Saying number names aloud is not required.
- No public timing or races. Counting games go round the class or pair, and a child may pass.

Assessment

Observe during paired work and keep a class list with one column per outcome. A one-to-one check (about 5 minutes per child) during the fourth week:

- "Show me 100 with towers. How many tens is it?" (10.) "Show me 600 with hundred cards." (6 cards.)
- "Build 438. How many hundreds, tens and ones? Write it as hundreds, tens and ones." (4 hundreds, 3 tens, 8 ones; 400 + 30 + 8.)
- Show the digit cards 5, 0, 6. "Read this number and build it." (Five hundred six: 5 hundreds, 0 tens, 6 ones.)
- "Count on in tens from 370." (380, 390, 400, 410.) "Count in fives from 225 to 250." (230, 235, 240, 245, 250.)
- "Which is more, 614 or 641? Put the right sign between them." (641; 614 < 641, because 1 ten is less than 4 tens.)
- "What is 100 more than 752? 10 less than 752? What is 400 + 500?" (852; 742; 900.)
- "Is 13 odd or even? Show me with counters." (Odd: 6 pairs and 1 left over.) "Make 3 rows of 5 counters and write an adding sentence for the total." (5 + 5 + 5 = 15.)

Record yes, with help or not yet for each part. A child who counts every cube in ones has the answer but not yet the place-value idea; note that rather than marking it wrong.

Sources

- Common Core State Standards, Grade 2 Number and Operations in Base Ten (read to check what is usually expected in grade 2, not to claim alignment): https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/2/NBT/
  - 2.NBT.A.1 the three digits of a three-digit number represent amounts of hundreds, tens and ones ("706 equals 7 hundreds, 0 tens, and 6 ones"), with 100 as "a bundle of ten tens" and 100, 200 ... 900 as one to nine hundreds; 2.NBT.A.2 count within 1000 and skip-count by 5s, 10s and 100s; 2.NBT.A.3 read and write numbers to 1000 using base-ten numerals, number names and expanded form; 2.NBT.A.4 compare two three-digit numbers using

    , = and <; 2.NBT.B.8 mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from it.

- Common Core, Grade 2 Operations and Algebraic Thinking: https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/2/OA/
  - 2.OA.C.3 odd or even for groups of up to 20 objects, "by pairing objects or counting them by 2s", and an even number as a sum of two equal addends; 2.OA.C.4 the total of a rectangular array with up to 5 rows and up to 5 columns, as a sum of equal addends.

Known gaps and cautions

- One other agent (Gemini 4 Argon, at 74bdc04) text-checked this unit on 2026-11-10 and reported no errors. That is a text check by an AI agent, not a teacher review or classroom test.
- Adding and taking away three-digit numbers where a new ten or hundred is made, or one has to be broken (2.NBT.B.7), is only touched as a stretch task (10 more than 395, 10 less

than 608). Adding up to four two-digit numbers (2.NBT.B.6) is not taught here. The grade 2 year plan does not give either a full unit, so a teacher may want to add one.

- English number names differ: some speakers say "five hundred six" and others "five hundred and six". Both are accepted; use the form your school uses on the word cards.
- Hundred cards are flat while towers are not, so a hundred card stands for ten towers rather than looking exactly like them. Lesson 1 has children lay towers on a card to check.
- Arrays stop at 5 by 5 and only use adding; multiplying is left for grade 3.
- Hen's seed shop and the other names (Duck, Mouse, Goat, Bear) are the made-up Little Hill characters used in other units.
- The lesson order, timings, examples and the seed-shop context are my choice, not taken from a source.

Lesson 1: Ten tens make a hundred

Unit overview - Next: Lesson 2

About 45 minutes.

Goal

Children see that ten tens make a hundred, use hundred cards to stand for a hundred, and count in hundreds to 1000.

Materials

- Per pair: 10 towers of ten linking cubes, 20 loose cubes and 9 hundred cards (10 by 10 grid, raised lines).
- Ten extra hundred cards for the class.
- Hen's seed shop picture cards: a loose seed, a packet of 10 seeds, and a box of 100 seeds (10 packets), plus order cards: "3 boxes", "5 boxes", "2 boxes and 4 packets", "6 boxes, 1 packet and 7 seeds".
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Count in tens to 100 together, holding up a tower for each ten: 10, 20, 30 ... 100. "How many towers did we need to make 100?" (10.)

✎ Main activity (30 min)

1. **Ten towers on a card (10 min).** Each pair lays its 10 towers side by side on one hundred card. "The towers cover the whole card. Ten tens is one hundred." Children count the towers in tens to check (10, 20 ... 100) and run a finger along one row of the grid (10 squares) and down one column (10 rows). From now on, one hundred card stands for ten towers.
2. **Counting in hundreds (10 min).** Pairs put their hundred cards in a line along the floor or tables, and the class counts them in hundreds: 100, 200, 300 ... When the line has 9 cards, ask "What is one more hundred?" Add one of the class's extra cards: 1000, "one thousand", which is ten hundreds. Count back in hundreds from 1000 to 100. Ask "How many hundreds make 700?" (7) and "What number is 4 hundreds?" (400).
3. **Hen's seed shop (10 min).** Show the seed shop cards: Hen sells loose seeds, packets of 10 and boxes of 100. Read each order card; pairs build it with hundred cards, towers and cubes and say the number:
    - "3 boxes" (300)
    - "5 boxes" (500)
    - "2 boxes and 4 packets" (240)

    - "6 boxes, 1 packet and 7 seeds" (617)

✓ Discussion questions (with answers)

- How many ones are in a hundred? 100: ten tens, and each ten is ten ones.
- Why do we use a card instead of ten towers? It is quicker to build and count big numbers; the card covers exactly the same space as ten towers.
- What is ten hundreds? One thousand (1000).

✓ Closing check (10 min, with answers)

"Show me 400 with hundred cards." (4 cards.) "How many tens make 100?" (10.) "How many hundreds is 700?" (7.) Note who counts the cards in hundreds and who counts the grid squares one by one.

Vocabulary

hundred, hundred card, tens, ones, thousand, box, packet

Differentiation

- **Support:** build 100 with towers first, then 200 with towers on two cards, before using cards alone.
- **Stretch:** "Hen has 1000 seeds in boxes. How many boxes?" (10.) "How many packets of 10 make 300?" (30.)
- Children who are blind or have low vision feel the towers on the card and the raised grid; the line of cards can be on a table so it can be touched along its length.

⚠ Safety

Use cubes too large to swallow. Keep the floor line of cards out of walkways.

Teacher notes and misconceptions

- Some children think a hundred card is "one" because it is one piece. Keep asking "How many tens is that card?" and let them check with towers.
- Thousand is mentioned only as ten hundreds; numbers above 1000 are not taught.

Lesson 2: Hundreds, tens and ones

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 45 minutes.

Goal

Children build, read and write three-digit numbers as numerals, number names and hundreds, tens and ones, including numbers with a zero.

Materials

- Per pair: 9 hundred cards, 10 towers of ten, 20 loose cubes and a hundreds-tens-ones mat.
- Three sets of digit cards 0 to 9 per pair.
- Number-name word cards per pair (one to nine, ten to nineteen, twenty to ninety, hundred).
- Hen's seed shop picture cards (from lesson 1).
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Count in hundreds from 100 to 900 and back, pointing to hundred cards. Show the seed shop box card: "How many seeds in 3 boxes?" (300.)

✎ Main activity (30 min)

1. **Build it and read it (10 min).** On the board: 243. Build it on the mat: 2 hundred cards, 4 towers and 3 loose cubes. "2 hundreds, 4 tens and 3 ones: two hundred forty-three." Show the digit cards 2, 4, 3 under the right columns. Pairs build, put digit cards under and read:
    - 365
    - 512
    - 128
2. **When there is a zero (10 min).** Build 706: 7 hundred cards, no towers, 6 cubes. "The tens column is empty, so we write 0 tens: seven hundred six." Then build 760 and 67 next to it. "Which has the most? Which digit tells you?" (760: it has 7 hundreds and 6 tens; 67 has no hundreds.) Pairs build 607 and 670 and say how they differ (607 has 0 tens and 7 ones; 670 has 7 tens and 0 ones).
3. **Three ways to write it (10 min).** Show 352 three ways: the numeral, the name (three hundred fifty-two, with word cards) and hundreds, tens and ones (300 + 50 + 2). Pairs choose two numbers they built and write each in all three ways. Words may be built from word cards instead of written.

✓ Discussion questions (with answers)

- Why can't we leave out the 0 in 706? Without it, the 7 and 6 move up and the number reads 76, which is much less.
- In 352, what is the 5 worth? 50, or 5 tens.
- Is 300 + 50 + 2 the same number as 352? Yes, it is the same number split into hundreds, tens and ones.

✓ Closing check (10 min, with answers)

"Build 409 and tell me how many hundreds, tens and ones." (4 hundreds, 0 tens, 9 ones; 400 + 9.) "What number is 300 + 50 + 2?" (352.) Note who puts a 0 in the tens place and who writes 49.

Vocabulary

hundreds, tens, ones, digit, zero, number name

Differentiation

- **Support:** build only hundreds and tens first (340, 520), then add ones.
- **Stretch:** "Make the biggest and the smallest number you can with the digit cards 3, 0 and 8." (830 and 308; a number does not start with 0.)
- Children who are blind or have low vision feel the raised columns on the mat and the grid on the hundred cards; number names can be said, signed or pointed to instead of written.

⚠ Safety

Use cubes too large to swallow.

Teacher notes and misconceptions

- Some children write two hundred forty-three as 20043, writing each part as they hear it. Building on the mat and putting one digit card under each column helps.
- Some speakers say "two hundred and forty-three". Both forms are fine.

Lesson 3: Counting in fives, tens and hundreds, and comparing

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 45 minutes.

Goal

Children count on within 1000, including across a hundred, count in fives, tens and hundreds from different starting numbers, and compare three-digit numbers using >, = and <.

Materials

- Per pair: 9 hundred cards, 10 towers of ten, 20 loose cubes, a hundreds-tens-ones mat, three sets of digit cards 0 to 9, and symbol cards

  , = and <.

- The large number line from 0 to 1000 marked in hundreds, for the board.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Count in fives from 0 to 50 together, clapping on each number. Then count on in ones from 196 to 204, pointing near 200 on the number line: 197, 198, 199, 200, 201 ... "What happened after 199?" (A new hundred: 200.)

✎ Main activity (30 min)

1. **Counting from different places (10 min).** Go round the class or pair, each child saying the next number (a child may pass):
   - fives from 115 to 150 (120, 125, 130, 135, 140, 145, 150)
   - tens from 340 to 420 (350, 360, 370, 380, 390, 400, 410, 420)
   - hundreds from 50 to 950 (150, 250, 350 ... 950) Point to roughly where each count is on the number line.
2. **Which is more? (10 min).** Duck's sack has 352 seeds; Mouse's sack has
3. Pairs build both. "Look at the hundreds first: both have 3. Then the tens: 5 tens is more than 2 tens. So 352 is more." Write 352 > 325 and read it: "352 is greater than 325." Show that < means "is less than", and that the wide-open side of the sign faces the bigger number. Pairs compare and put a symbol card between:
   - 418 and 481 (418 < 481)
   - 609 and 690 (609 < 690)
   - 700 and 699 (700 > 699)
   - 534 and 534 (534 = 534)

4. **Make and compare (10 min).** Each child in a pair draws three digit cards and makes a three-digit number (not starting with 0). Together they build both, put the right symbol between and read the sentence. Play several rounds; there is no winner, only the sentence.

✓ Discussion questions (with answers)

- Why do we look at the hundreds first? A hundred is more than any number of tens and ones we could have in the other columns (99 at most), so the hundreds decide unless they are the same.
- 700 has only zeros after the 7. Why is it more than 699? 700 has 7 hundreds; 699 has only 6 hundreds and 9 tens and 9 ones, which is one less.
- What comes after 399? 400.

✓ Closing check (10 min, with answers)

"Which is more, 263 or 236? How do you know?" (263: same hundreds, and 6 tens is more than 3 tens.) "Put the right sign: 507 and 570." (507 < 570.) "Count on in tens from 280." (290, 300, 310.)

Vocabulary

greater than, less than, equal to, compare, count on, fives

Differentiation

- **Support:** compare numbers with different hundreds first (245 and 512), building both, before numbers with the same hundreds.
- **Stretch:** "Put these in order from least to greatest: 489, 498, 849, 894." (489, 498, 849, 894.) Count back in tens from 430 to 370 (420, 410, 400, 390, 380, 370).
- Children who are blind or have low vision feel the symbol cards and the built numbers; counts can be tapped on a table as well as said.

⚠ Safety

Use cubes too large to swallow.

Teacher notes and misconceptions

- Some children say 418 is more than 481 "because 8 is bigger than 1". Going column by column, starting with the hundreds, fixes this.
- Counting on across a hundred (what comes after 399, or after 390 when counting in tens) is often shaky; keep it in daily counting practice.

Lesson 4: 10 more, 10 less, 100 more, 100 less

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 45 minutes.

Goal

Children say 10 more, 10 less, 100 more and 100 less than a number from 100 to 900 in their heads, and add or take away whole hundreds or whole tens when no new ten or hundred is made.

Materials

- Per pair: 9 hundred cards, 10 towers of ten, 20 loose cubes, a hundreds-tens-ones mat, three sets of digit cards 0 to 9 and symbol cards

  , = and <.

- The counting-in-tens chart for the board and one large-print copy per pair.
- The large number line from 0 to 1000 marked in hundreds.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Quick 10 more and 10 less within 100, as in term 1: "10 more than 47?" (57.) "10 less than 62?" (52.) "10 more than 90?" (100.)

✎ Main activity (30 min)

1. **Change one card (10 min).** Pairs build 346. "Add one hundred card. What number is it now?" (446.) "Take it away again and add one tower." (356.) "Which digit changed each time?" (The hundreds digit for 100 more, the tens digit for 10 more.) Pairs build, change and say:
   - 100 more than 521 (621)
   - 100 less than 874 (774)
   - 10 more than 235 (245)
   - 10 less than 653 (643)
2. **The counting-in-tens chart (10 min).** On the chart, 10 more is one step along a row and 100 more is one row down. Start at 340: one step along (350), one row down (450). Pairs find on their copies: 100 less than 580 (480), 10 more than 720 (730), 100 more than 260 (360). Then without the chart: "What is 100 more than 263?" (363.)
3. **Whole hundreds and whole tens (10 min).** "3 hundreds and 4 hundreds is 7 hundreds, so 300 + 400 = 700." Pairs work out in their heads and check with cards:
   - 300 + 400 (700)

    - 800 - 500 (300)
    - 240 + 30 (270)
    - 570 - 40 (530)
    - 600 + 200 + 100 (900)

✓ Discussion questions (with answers)

- Why does only one digit change when we add 100 to 346? We add one hundred, so only the number of hundreds changes; the tens and ones stay the same.
- Why is 300 + 400 like 3 + 4? We are adding hundreds instead of ones: 3 hundreds and 4 hundreds are 7 hundreds.
- On the chart, why is one row down 100 more? Each row has ten steps of 10, which is 100.

✓ Closing check (10 min, with answers)

"What is 100 more than 263?" (363.) "10 less than 263?" (253.) "What is 500 + 300?" (800.) "700 - 200?" (500.) Note who answers in their head and who needs to build.

Vocabulary

10 more, 10 less, 100 more, 100 less, in my head

Differentiation

- **Support:** keep building every number and changing one card or tower before trying in their heads.
- **Stretch:** "10 more than 395?" (405: 9 tens and 1 more ten make a new hundred.) "10 less than 608?" (598: a hundred is broken into ten tens.) Children check with cards and towers.
- Children who are blind or have low vision use the mat and cards; the counting-in-tens chart can have raised lines between rows, or be skipped in favour of building.

⚠ Safety

Use cubes too large to swallow.

Teacher notes and misconceptions

- Some children add 100 by adding 1 to the ones digit (346 becomes 347). Ask "What did you add: a cube, a tower or a hundred card?"
- The stretch tasks cross a hundred, which needs a new hundred to be made or a hundred to be broken. That is not expected of everyone in this unit.

Lesson 5: Odd and even, and equal rows

Unit overview - Previous: Lesson 4

About 45 minutes.

Goal

Children tell whether a group of up to 20 objects is odd or even by pairing, write an even number as a double, and find the total of an array with up to 5 rows and 5 columns by adding equal rows.

Materials

- 20 counters per child, too large to swallow.
- A squared mat per child: a sheet ruled into 5 rows of 5 squares, with raised lines.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Count in twos to 20 together, then back to 0.

✎ Main activity (30 min)

1. **Can every counter have a partner? (12 min).** Take 12 counters and put them in pairs: 6 pairs and none left over. "12 is even." Take 13: 6 pairs and 1 left over. "13 is odd." Children test these and sort them into odd and even:
    - 8 (even: 4 pairs)
    - 11 (odd: 5 pairs and 1 left)
    - 14 (even: 7 pairs)
    - 17 (odd: 8 pairs and 1 left)
    - 20 (even: 10 pairs)
    - 9 (odd: 4 pairs and 1 left) Then split each even number into two equal rows and write it as a double: 12 = 6 + 6, 14 = 7 + 7, 20 = 10 + 10.
2. **Goat's carrot rows (13 min).** Goat plants carrots in rows with the same number in each row. Show 3 rows of 4 on the mat: "4 + 4 + 4 = 12." Children build each array on their mat with counters and write an adding sentence:
    - 2 rows of 5 (5 + 5 = 10)
    - 4 rows of 3 (3 + 3 + 3 + 3 = 12)
    - 3 rows of 5 (5 + 5 + 5 = 15)
    - 5 rows of 5 (5 + 5 + 5 + 5 + 5 = 25)
3. **Turn it round (5 min).** Turn the mat a quarter turn so 4 rows of 3 become 3 rows of 4. "Is it the same number of carrots?" (Yes, 12: 3 + 3 + 3 + 3 = 12 and 4 + 4 + 4 = 12.)

✓ Discussion questions (with answers)

- How can you tell 17 is odd without counting by ones? Put the counters in pairs: one is always left over.
- Is every double an even number? Yes: two equal rows can always be put together in pairs, one from each row.
- Why is adding rows quicker than counting every carrot? Each row has the same number, so we can count on in that number.

✓ Closing check (10 min, with answers)

"Is 15 odd or even? Show me." (Odd: 7 pairs and 1 left over.) "Write 16 as a double." (8 + 8.) "Make 2 rows of 4 and write an adding sentence." (4 + 4 = 8.)

Vocabulary

odd, even, pair, double, row, column, array

Differentiation

- **Support:** work with numbers up to 10 for odd and even, and arrays with 2 rows first.
- **Stretch:** "Make every array you can with 12 counters, using no more than 5 rows and 5 columns." (3 rows of 4 and 4 rows of 3.) "Is the total of two odd numbers odd or even? Try some." (Even: the two left-over counters make a pair.)
- Children who are blind or have low vision feel the raised squares on the mat and the pairs of counters; answers can be said, signed or shown with counters.

⚠ Safety

Use counters too large to swallow.

Teacher notes and misconceptions

- Some children think a number is even if it "looks big" or ends in a big digit. Pairing real counters is the check.
- Multiplying and the times sign are not taught here; arrays are counted by adding equal rows.

Grade 2 Mathematics: Measuring, Time, Money and Shapes (5 lessons, about 5 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 11 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check coins, units and clock conventions against your school's rules and your country's money.
>
> Text-checked by two other agents (Gemini 3.8 Flash and Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 3. Builds on grade 1: Measuring length and composing shapes and grade 2 term 2: Hundreds, tens and ones to 1000

Big idea

We measure by counting equal units, and a ruler is a line of equal units already counted for us, starting from 0. A smaller unit needs more of them to cover the same length. Clocks and coins also use counting: the minute hand moves in fives, and coins of different values can be counted on from the biggest. Shapes can be named by counting their sides and corners, and a bar graph lets us count and compare a set of data at a glance.

Outcomes

By the end of the unit most children can:

1. Measure a length to the nearest whole centimetre with a ruler, starting at the 0 mark, and say how much longer one length is than another (25 cm is 10 cm longer than 15 cm).
2. Measure the same length in centimetres and in inches, explain why the number of centimetres is bigger (a centimetre is a smaller unit, so more of them are needed), and estimate lengths in centimetres, inches, feet or metres before measuring.
3. Tell and write the time to five minutes on a clock with hands and as digital time (4:25), and say whether a time in a story is a.m. or p.m.
4. Find the value of a set of coins (pennies, nickels, dimes and quarters) by counting on from the biggest value, write it with the ¢ sign, know that $1 is 100¢, and solve one-step story problems with made-up prices.
5. Name triangles, quadrilaterals, pentagons and hexagons by counting sides and corners, say how many faces a cube has, and put shapes together to make a new shape.
6. Make a bar graph with up to four categories, one square for each item, and use it to answer "how many altogether?" and "how many more?" questions.

Prior knowledge

The grade 1 unit on measuring length and composing shapes (lining up ends, measuring with equal units laid end to end, triangles, squares and rectangles, putting shapes together), counting in fives and tens from grade 2 term 2, and adding and taking away within 100 from grade 2 term 1. No earlier unit in this set teaches clocks or coins, so lesson 3 starts with o'clock and half past and lesson 4 starts by meeting the coins.

Lessons

Each lesson is about 45 minutes: a short whole-class start, paired work and a closing check. The five topics are quite different, so a teacher may want to spread each lesson over two or three days; the unit runs over about 5 weeks, with short daily practice (5 minutes) reading the class clock and counting coins.

1. Measuring with a centimetre ruler
2. Centimetres and inches
3. Telling the time to five minutes
4. Counting coins at the Little Hill market
5. Sides, corners and a shape bar graph

Materials (whole class unless noted)

- A 30 cm ruler per pair, marked in whole centimetres with the 0 clearly marked, and with inches on the other edge (lessons 1 and 2). Tactile rulers with raised or notched marks for children who need them.
- Paper strips per pair, cut exactly to length, each with its letter in large print and a raised dot sticker on the left end: A 10 cm, B 15 cm, C 20 cm, D 25 cm and E 12 cm (lessons 1 and 2). A few spare raised dot stickers.
- Linking cubes too large to swallow, about 10 per pair, as in grade 1 (lesson 1).
- Small classroom objects per pair to measure: a pencil, a crayon, a glue stick and a book (lessons 1 and 2).
- A large board ruler or number line from 0 to 40 (lesson 1).
- A metre stick and a 12-inch ruler (one foot) for the teacher (lesson 2).
- A two-column chart headed "centimetres" and "inches" for the board, and a copy per pair (lesson 2).
- A teaching clock with geared hands for the board, and a card clock per pair with an hour hand and a minute hand fixed by a paper fastener (lesson 3; see Safety and access).
- Digital time cards in large print, and Little Hill day cards (lesson 3; see lesson 3).
- A minutes card per pair for support: a ring of 5, 10, 15 ... 60 to sit around the card clock (lesson 3).
- Card coins per pair, too large to swallow, printed on both sides with the value raised (glued string or thick glue) so it can be felt: 4 quarters, 6 dimes, 6 nickels and 10 pennies, plus one card dollar bill (lesson 4).
- Little Hill market price cards with made-up prices (lesson 4; see lesson 4).
- Card shapes per pair in different sizes and turned different ways: triangles, quadrilaterals (including squares, rectangles and some with no equal sides), pentagons and hexagons (lesson 5).
- Pattern blocks too large to swallow, per pair: 6 triangles, 2 trapezoids, 2 rhombuses (diamonds) and 1 hexagon (lesson 5).
- A cube per pair, such as a large wooden or foam block (lesson 5).
- A shape bag per pair holding exactly 19 card shapes: 5 triangles, 7 quadrilaterals, 3 pentagons and 4 hexagons (lesson 5).
- Squared paper (2 cm squares) and dot paper per child; card squares and glue for raised bar graphs (lesson 5). Small stickers for marking corners (lesson 5).
- A bar graph for the board made with raised card squares: boats on the Little Hill pond, with sailing boats 3, rowing boats 5 and canoes 2 (lesson 5).
- Whiteboards and pens, or paper and pencils.

⚠ Safety and access

- **Small parts:** card coins, not real coins (real coins are a choking risk and are handled by many people). Pattern blocks and shapes too large to swallow.
- **Card clocks:** an adult fixes the paper fasteners before the lesson and tapes over the sharp ends on the back.
- **Seeing and touching:** tactile rulers, raised dot stickers on the strips, card coins with raised values, raised clock numbers (glued string or thick glue dots) and bar graphs made from stuck-on card squares let children who are blind or have low vision measure, read and compare by touch. Large-print or braille labels help children who read them. Children can feel the clock hands on the teaching clock or their card clock.
- **Answering:** pointing, moving cards, sign, writing or a communication device all count as answers. Saying number names aloud is not required.
- **Privacy:** times, prices and data in the lessons are about the made-up Little Hill characters and a bag of shapes. Never ask children about their own wake or bed times, family money, pocket money or what things cost at home.
- No public timing or races. Games go round the pair or group, and a child may pass.

Assessment

Observe during paired work and keep a class list with one column per outcome. A one-to-one check (about 5 minutes per child) during the last week:

- Give strip E and a ruler. "How long is this strip?" (12 cm.) "Strip D is 25 cm. How much longer is it than strip E?" (13 cm.)
- "Measure strip C in centimetres and in inches." (20 cm; about 8 inches.) "Why is the number of inches smaller?" (An inch is longer than a centimetre, so fewer inches fit.)
- Set the teaching clock to 9:50. "What time is it? Write it." (9:50; ten to ten is also fine.) "Duck eats breakfast at 7:20. Is that a.m. or p.m.?" (a.m.)
- Give a quarter, a dime, a nickel and two pennies. "How much money is this?" (42¢.) "A ribbon costs 20¢ and a pencil costs 15¢. How much for both?" (35¢.)
- Show a card shape with 6 sides that are not all the same length. "What is this shape called? How do you know?" (A hexagon: 6 sides and 6 corners.) "How many faces does a cube have?" (6.)
- Show a bar graph of kites at the Little Hill fair: red 4, blue 6, yellow 2, green 3. "How many kites altogether?" (15.) "How many more blue kites than yellow kites?" (4.)

Record yes, with help or not yet for each part. A child who starts a ruler at the 1 mark and is 1 out every time has a measuring habit to fix, not a counting problem; note that rather than marking it wrong.

Sources

- Common Core State Standards, Grade 2 Measurement and Data (read to check what is usually expected in grade 2, not to claim alignment): https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/2/MD/
  - 2.MD.A.1 "Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes."; 2.MD.A.2 measure an object twice with units of different lengths and "describe how the two measurements relate to the size of the unit chosen"; 2.MD.A.3 "Estimate lengths using units of

inches, feet, centimeters, and meters."; 2.MD.A.4 measure "how much longer one object is than another".
    - 2.MD.B.5 adding and taking away within 100 in word problems about lengths, "by using drawings (such as drawings of rulers)".
    - 2.MD.C.7 "Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m."; 2.MD.C.8 "Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately." with the example "If you have 2 dimes and 3 pennies, how many cents do you have?"
    - 2.MD.D.10 "Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories."
- Common Core, Grade 2 Geometry: https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/2/G/
    - 2.G.A.1 "Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces." and "Identify triangles, quadrilaterals, pentagons, hexagons, and cubes."
- Common Core, Grade 1 Measurement and Data, read to check what children may have met before: 1.MD.B.3 "Tell and write time in hours and half-hours using analog and digital clocks." https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/1/MD/

Known gaps and cautions

- Two other agents (Gemini 3.8 Flash and Gemini 4 Argon, both at 122c91c) text-checked this unit on 2026-11-11 and reported no errors. Those are text checks by AI agents, not a teacher review or classroom test.
- Some grade 2 standards are not taught here: line plots of measurement data (2.MD.D.9), partitioning a rectangle into rows and columns of squares (2.G.A.2), and halves, thirds and fourths of circles and rectangles (2.G.A.3). Number lines (2.MD.B.6) appear only in lesson 1. A teacher may want to add these.
- The coins are United States coins because the Common Core standard names them. Schools in other countries should use their own coins and change the values in lesson 4. Writing amounts with a decimal point ($0.42) is not taught; amounts under a dollar are written with ¢.
- Inches and feet are used in the United States; many other countries use only centimetres and metres. Lesson 2 can be taught with centimetres and a longer unit such as a 5 cm card strip instead of inches.
- The strips in lessons 1 and 2 were chosen so the inch measurements are close to whole numbers (25 cm is about 9.8 inches, so "about 10 inches"). Children measure to the nearest whole unit, so small differences between pairs are expected.
- Many rulers have a gap before the 0 mark. Lesson 1 teaches starting at 0 for this reason.
- Clocks with hands are less common in some homes than digital ones, so some children will need much more practice than one lesson; the daily 5 minutes matters. Times are always on a five-minute mark; reading to the nearest five minutes when the hand is between marks is left for later practice.
- The prices, times and graph data are made up for Little Hill and are not real prices or schedules. Duck, Hen, Mouse, Goat and Mayor Hen are the made-up Little Hill characters used in other units.
- The lesson order, timings, strip lengths, examples and contexts are my choice, not taken from a source.

Lesson 1: Measuring with a centimetre ruler

Unit overview - Next: Lesson 2

Back to the grade 2 year plan

About 45 minutes.

Goal

Children measure lengths to the nearest whole centimetre with a ruler, starting at the 0 mark, and find how much longer one length is than another.

Materials

- A 30 cm ruler per pair, with the 0 clearly marked. Tactile rulers with raised or notched marks for children who need them.
- Paper strips per pair, cut exactly to length, each with its letter in large print and a raised dot sticker on the left end: A 10 cm, B 15 cm, C 20 cm, D 25 cm and E 12 cm. A few spare raised dot stickers.
- Small classroom objects per pair: a pencil, a crayon, a glue stick and a book.
- A large board ruler or number line from 0 to 40.
- Linking cubes too large to swallow, about 10 per pair, for the opening.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Hold up strip C next to a row of linking cubes laid end to end. "In grade 1 we measured by laying equal units with no gaps or overlaps. How many cubes long is this strip?" (Count with the class; the answer depends on your cubes.) "Different cubes give different answers. A ruler uses a unit everyone agrees on: the centimetre. The small spaces between the marks are each one centimetre, and the numbers have already counted them for us."

✎ Main activity (30 min)

1. **Start at 0 (10 min).** On the board ruler, show that the numbers count the spaces, not the lines: the space from 0 to 1 is the first centimetre. Show strip A lined up with the very end of a real ruler (many rulers have a gap before the 0) and read where it ends. Then line it up with the 0 mark. "Which way gives the right length?" (Starting at 0: strip A is 10 cm.) Next lay strip A from the 1 mark to the 11 mark. "It ends at 11. Is it 11 cm long?" (No: count the spaces from 1 to 11; there are 10.) Children who use a tactile ruler feel for the 0 notch first.
2. **Measure the strips (10 min).** Pairs measure strips A to D, taking turns to hold the ruler and to read the number, and write each length with "cm": A 10 cm, B 15 cm, C 20 cm, D 25 cm. Then they measure the pencil, crayon, glue stick and book to the nearest

whole centimetre. "If the end is between two numbers, which number is it closer to?" Answers for the objects will differ between pairs.

3. **How much longer? (10 min).** "Put strips D and B side by side, lined up at one end. How much longer is D?" Measure the part of D that sticks out, or take away: 25 - 15 = 10, so D is 10 cm longer. Repeat with C and A (10 cm) and D and A (15 cm). Then a story, drawn as a ruler on the board with jumps along the number line: "Goat's kite tail is 34 cm long. Duck's kite tail is 20 cm long. How much longer is Goat's?" (34 - 20 = 14, so 14 cm.) Show the jump from 20 to 34 on the board number line.

✓ Discussion questions (with answers)

- Why do we start at 0 and not at the end of the ruler? The numbers count centimetres from the 0 mark. Many rulers have a gap before the 0, so starting at the end gives the wrong length.
- Why is everyone's strip D the same length but their pencils different? The strips were cut to the same length; the pencils are different pencils.
- Can you measure a strip that does not start at 0? Yes, by counting the centimetres from where it starts to where it ends, but starting at 0 is easier.

✓ Closing check (10 min, with answers)

"Measure strip E." (12 cm.) "A strip starts at 2 and ends at 9 on a ruler. How long is it?" (7 cm.) "Mouse's ribbon is 18 cm long and Hen's ribbon is 30 cm long. How much longer is Hen's ribbon?" (12 cm.) Note who starts at 0 every time and who still starts at the end or at 1.

Vocabulary

centimetre, cm, ruler, length, measure, longer, shorter, how much longer, nearest

Differentiation

- **Support:** measure only strips A to D, which end on numbers that end in 0 or 5, before measuring objects. Put a spare raised dot sticker on the 0 mark of the ruler.
- **Stretch:** "Which two strips together are as long as strip D?" (A and B: 10 + 15 = 25.) "How much longer is strip D than strip E?" (13 cm.)
- Children who are blind or have low vision use a tactile ruler and the raised dot on the left end of each strip, and count notches from the 0 notch with a finger.

⚠ Safety

Use linking cubes too large to swallow. Rulers stay on tables, not waved.

Teacher notes and misconceptions

- Many children start at the end of the ruler or at 1. Ask "Where does the first centimetre start?" and let them check by counting spaces.

- Some children count the lines instead of the spaces and get one more than the length. Point to each space as it is counted.
- "Cm" is the short way to write centimetres; the "s" is never added.

Lesson 2: Centimetres and inches

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Back to the grade 2 year plan

About 45 minutes.

Goal

Children measure the same strips in centimetres and in inches, explain why the number of centimetres is bigger, and estimate lengths before measuring.

Materials

- A 30 cm ruler per pair with inches on the other edge. Tactile rulers with raised or notched marks for children who need them.
- Paper strips A to E per pair from lesson 1 (A 10 cm, B 15 cm, C 20 cm, D 25 cm, E 12 cm), each with a raised dot sticker on the left end.
- Small classroom objects per pair: a pencil, a crayon, a glue stick and a book.
- A metre stick and a 12-inch ruler (one foot) for the teacher.
- A two-column chart for the board headed "centimetres" and "inches", and a copy per pair.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

"Last time strip D was 25 cm long. Turn your ruler over. The other edge has bigger spaces. Each of those spaces is one inch." Show one centimetre and one inch on the board side by side. "Which is longer, a centimetre or an inch?" (An inch.)

✎ Main activity (30 min)

1. **Measuring in inches (10 min).** Pairs measure strips A to D on the inch edge, starting at 0, to the nearest whole inch, and write the answers in the inches column of their chart. The strips do not end exactly on an inch mark, so the class agrees which mark each end is closest to: A about 4 inches, B about 6 inches, C about 8 inches, D about 10 inches.
2. **Same strip, two numbers (10 min).** Pairs copy the centimetre lengths from lesson 1 into the other column: A 10, B 15, C 20, D 25. "Strip D is 25 cm and about 10 inches. It is the same strip. Why is the number of centimetres bigger?" Take ideas, then show with strip D: lay a finger on each centimetre space and then on each inch space. "An inch is longer than a centimetre, so fewer inches fit along the strip. A smaller unit needs more of them." Link to grade 1: when the class measured with smaller units, it needed more of them to cover the same length.

3. **Estimate, then measure (10 min).** Show the metre stick (100 cm) and the 12-inch ruler ("12 inches is one foot"; a 30 cm ruler is about one foot long). For each object, pairs first write a guess, then measure:
    - the pencil and the book in centimetres;
    - the crayon and the glue stick in inches;
    - with the teacher: "Is the classroom door wider or narrower than one metre?" The teacher holds the metre stick against the door so the class can check.

Guesses that are close count as good estimates; the point is to have a picture of each unit in mind.

✓ Discussion questions (with answers)

- If you measure the same book in centimetres and in inches, which number is bigger? The centimetres, because a centimetre is a smaller unit.
- Why did different pairs get "about 6 inches" for strip B when it does not end exactly on 6? It is closer to the 6 mark than to the 5 or 7 mark, so we say about 6 inches.
- Would you measure the classroom in centimetres or in metres? Metres would be quicker; centimetres would give a very big number.

✓ Closing check (10 min, with answers)

"Measure strip E in inches." (About 5 inches.) "A strip is 8 inches long. Will its length in centimetres be a bigger number or a smaller number?" (Bigger.) "Which do you need more of to measure the same book, centimetres or inches?" (Centimetres.) Note who explains with the size of the unit and who only says "because the numbers are different".

Vocabulary

inch, foot, metre, centimetre, estimate, about, unit, closest

Differentiation

- **Support:** measure strips C and D only, with a finger walking along each inch space while counting.
- **Stretch:** "Strip D is about 10 inches. Two strips D laid end to end would be about how many inches?" (About 20.) "How many centimetres?" (50.)
- Children who are blind or have low vision feel the bigger notches on the inch edge of a tactile ruler and compare one centimetre space with one inch space by touch.

⚠ Safety

Only the teacher handles the metre stick. Rulers stay on tables, not waved.

Teacher notes and misconceptions

- Some children think a bigger number means a longer object even when the units differ. Keep putting the same strip next to both edges of the ruler.
- On some rulers the inch edge is split into halves and quarters as well. Show children which marks are the whole inches (the longest marks with numbers).
- In countries that do not use inches, the same idea can be shown with centimetres and a 5 cm card strip as a longer unit.

Lesson 3: Telling the time to five minutes

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Back to the grade 2 year plan

About 45 minutes.

Goal

Children read and set times to five minutes on a clock with hands, write them as digital times, and decide whether a time in a story is a.m. or p.m.

Materials

- A teaching clock with geared hands for the board, with raised numbers (glued string or thick glue dots) so it can be felt.
- A card clock per pair with an hour hand and a minute hand fixed by a paper fastener. An adult fixes the fasteners before the lesson and tapes over the sharp ends on the back.
- Digital time cards in large print: 3:00, 3:30, 4:25, 7:40, 10:05, 11:55.
- Little Hill day cards, each with a picture, a sentence and a time: "Hen opens the bakery at 7:15 in the morning", "The bus leaves for school at 8:40 in the morning", "Lunch is ready at the market at 12:10 in the afternoon", "Mayor Hen rings the town bell at 3:25 in the afternoon", "The lamps on the bridge are lit at 6:45 in the evening".
- A minutes card per pair for support: a ring of 5, 10, 15 ... 60 to sit around the card clock, one number beside each clock number.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Point to each number on the teaching clock and count in fives together: 1 is 5 minutes, 2 is 10 minutes, and so on round to 12, which is 60 minutes or "o'clock". "The minute hand goes all the way round in one hour. Each number is 5 more minutes."

✎ Main activity (30 min)

1. **O'clock and half past (8 min).** "The short hand is the hour hand. The long hand is the minute hand." Set 3:00: the minute hand on 12, the hour hand on 3. Move the minute hand slowly round to 6 and show the hour hand moving too. "Half an hour has gone. It is half past 3, or 3:30. The hour hand is halfway between 3 and 4." Show the digital cards 3:00 and 3:30.
2. **Five-minute jumps (12 min).** Set 4:25 on the teaching clock. "The minute hand points to 5. Count in fives: 5, 10, 15, 20, 25. The hour hand has gone past 4 but is not yet halfway to 5. It is 4:25." Pairs set each time on their card clock and match the digital card: 7:40 (minute hand on 8, hour hand more than halfway from 7 to 8), 10:05 (minute hand on 1, hour hand just past 10), 11:55 (minute hand on 11, hour hand

almost at 12 but still 11 o'clock and some minutes). Partners take turns: one sets a time, the other reads it and writes it.

3. **a.m. and p.m. (10 min).** "There are two of every time each day: one in the morning and one in the afternoon or evening. Times from midnight until midday are a.m. Times from midday until midnight are p.m." Hand out the Little Hill day cards. Pairs set each time on the card clock, write it with a.m. or p.m., then the class puts the cards in order through the day:
    - 7:15 a.m. Hen opens the bakery;
    - 8:40 a.m. the bus leaves for school;
    - 12:10 p.m. lunch is ready at the market;
    - 3:25 p.m. Mayor Hen rings the town bell;
    - 6:45 p.m. the lamps on the bridge are lit.

✓ Discussion questions (with answers)

- How do you know which hand is which? The hour hand is shorter; the minute hand is longer.
- At 11:55, the hour hand is almost on 12. Why do we say 11:55 and not 12:55? The hour hand has not reached 12 yet, so it is still 11 and some minutes.
- Is lunch at 12:10 a.m. or p.m.? p.m., because it is just after midday.

✓ Closing check (10 min, with answers)

Set 2:35 on the teaching clock. "What time is it? Write it." (2:35.) "Show me 6:10 on your clock." (Minute hand on 2, hour hand just past 6.) "Goat reads a story before bed at 7:30. Is that a.m. or p.m.?" (p.m.) Note who reads the hour from the number the hour hand has just passed, and who reads the nearest number.

Vocabulary

clock, hour hand, minute hand, o'clock, half past, minutes, a.m., p.m., morning, afternoon, evening, midday, midnight

Differentiation

- **Support:** set only o'clock, half past, and times where the minute hand points to 1, 2 or 3 (5, 10 or 15 minutes past). Put the minutes card around the card clock.
- **Stretch:** "The bus leaves at 8:40. Hen arrives 10 minutes later. What time does Hen arrive?" (8:50.) Talk about "quarter past" and "quarter to" as other ways to say 15 and 45 minutes.
- Children who are blind or have low vision feel the raised numbers and the hands of the teaching clock or their card clock.

⚠ Safety

An adult fixes the paper fasteners and tapes over the sharp ends before the lesson. Never ask children about their own wake, meal or bed times; the times belong to the Little Hill characters.

Teacher notes and misconceptions

- The most common mistake is reading the hour from the nearest number when the minute hand is past 30, so 9:50 is read as 10:50. Ask "Has the hour hand reached 10 yet?"
- Some children mix up the hands. Giving the minute hand a different colour and a different feel (a strip of tape along it) and saying "long hand, minutes" helps.
- Times exactly at 12:00 can confuse even adults (12:00 midday is often written 12:00 p.m.), so the lesson avoids them.
- Many children see more digital clocks than clocks with hands. Keep a clock with hands in the classroom and read it together each day.

Lesson 4: Counting coins at the Little Hill market

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Back to the grade 2 year plan

About 45 minutes.

Goal

Children name pennies, nickels, dimes and quarters and their values, find the value of a set of coins by counting on from the biggest, write amounts with the ¢ sign, and solve one-step story problems with made-up prices.

Materials

- Card coins per pair, too large to swallow, printed on both sides with the value raised (glued string or thick glue) so it can be felt: 4 quarters, 6 dimes, 6 nickels and 10 pennies, plus one card dollar bill. Draw the coins in the same order of size as real coins (the dime smallest, then the penny, the nickel and the quarter).
- Little Hill market price cards with made-up prices (an example, not real prices): pear 35¢, ribbon 20¢, pencil 15¢, packet of seeds 50¢, toy kite 75¢.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Count together in fives to 50 and in tens to 100, as in term 2. "Today we will use counting in fives and tens to count money."

✎ Main activity (30 min)

1. **Meeting the coins (8 min).** Show each card coin and say its value: a penny is 1 cent (1¢), a nickel is 5¢, a dime is 10¢ and a quarter is 25¢. A dollar is 100¢, written $1. Pairs sort their coins into four piles. "Which coin is the smallest?" (The dime.) "Which coin is worth the most?" (The quarter.) "Is the smallest coin worth the least?" (No: a dime is worth more than a penny or a nickel.)
2. **Counting a handful (12 min).** Model counting on from the biggest value: quarter, dime, dime, penny: "25, 35, 45, 46. That is 46¢." Pairs take turns to give their partner a set of coins to count, then try these together:
    - 2 dimes and 3 pennies (23¢);
    - 3 dimes, 2 nickels and 4 pennies (dimes 10, 20, 30; nickels 35, 40; pennies 41, 42, 43, 44: 44¢);
    - a quarter, a dime and a nickel (40¢);
    - 4 quarters (25, 50, 75, 100: 100¢, which is $1).

3. **The Little Hill market (10 min).** Put out the price cards. Pairs pay for each thing with card coins in one way, then find a second way (the pear, 35¢: a quarter and a dime, or 3 dimes and a nickel). Then story problems, solved with coins and written as a number sentence:
    - "Duck has 2 quarters and buys a pear. How much money is left?" (50¢ - 35¢ = 15¢.)
    - "Goat buys a packet of seeds and a pencil. How much is that?" (50¢ + 15¢ = 65¢.)
    - "Mouse has 60¢. The toy kite costs 75¢. How much more does Mouse need?" (75¢ - 60¢ = 15¢.)

✓ Discussion questions (with answers)

- Why do we start counting with the coin worth the most? It is quicker: big jumps first, then small ones.
- How many dimes make a dollar? 10, because 10 tens make 100.
- Can two children have different coins but the same amount of money? Yes: a quarter and a nickel is 30¢, and so are 3 dimes.

✓ Closing check (10 min, with answers)

Show 2 quarters, a dime and a penny. "How much money is this?" (61¢.) "Show me 30¢ in two different ways." (For example 3 dimes; a quarter and a nickel; 6 nickels.) "Hen has 50¢ and buys a packet of seeds. How much is left?" (0¢.) Note who counts on from the biggest coin and who counts every coin as 1.

Vocabulary

penny, nickel, dime, quarter, dollar, cent, ¢, $, value, worth, price, cost, left, more

Differentiation

- **Support:** use only dimes and pennies first, which works like tens and ones (3 dimes and 4 pennies is 34¢), then add nickels.
- **Stretch:** "Find all the ways to pay 25¢ with dimes, nickels and pennies if you use no more than 5 coins." (2 dimes and 1 nickel; 1 dime and 3 nickels; 5 nickels.)
- Children who are blind or have low vision feel the raised values on the card coins. Sorting by size alone does not work because the dime is the smallest coin.

⚠ Safety

Use card coins, not real coins: real coins are a choking risk and are handled by many people. Never ask children about family money, pocket money or what things cost at home; the prices belong to the Little Hill market.

Teacher notes and misconceptions

- Many children think a bigger coin is worth more, so the nickel seems worth more than the dime. Keep asking "What is it worth?" rather than "Which is bigger?"
- Some children count every coin as one. Ask "How many cents is this coin?" before counting.
- These are United States coins. Schools in other countries should use their own coins and change the values and prices.
- Writing amounts with a decimal point ($0.42) is not taught here; amounts under a dollar are written with ¢.

Lesson 5: Sides, corners and a shape bar graph

Unit overview - Previous: Lesson 4

Back to the grade 2 year plan

About 45 minutes.

Goal

Children name triangles, quadrilaterals, pentagons and hexagons by counting sides and corners, say how many faces a cube has, put shapes together to make new shapes, and make and read a bar graph with four categories.

Materials

- Card shapes per pair in different sizes and turned different ways: triangles, quadrilaterals (including squares, rectangles and some with no equal sides), pentagons and hexagons.
- Pattern blocks too large to swallow, per pair: 6 triangles, 2 trapezoids, 2 rhombuses (diamonds) and 1 hexagon.
- A cube per pair, such as a large wooden or foam block.
- A shape bag per pair holding exactly 19 card shapes: 5 triangles, 7 quadrilaterals, 3 pentagons and 4 hexagons.
- Squared paper (2 cm squares) and dot paper per child; card squares and glue for raised bar graphs. Small stickers for marking corners.
- A bar graph for the board, also made with raised card squares: boats on the Little Hill pond, with sailing boats 3, rowing boats 5 and canoes 2.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

"In grade 1 we found out what makes a triangle a triangle." Hold up a long, thin triangle and a square. "How did we know?" (Count the straight sides and the corners: 3 for a triangle.) "Today we count sides and corners to name more shapes."

✎ Main activity (30 min)

1. **Count and name (10 min).** Pairs take turns to pick a card shape, run a finger along each side while counting, then touch each corner. Name each group as it is found: 3 sides and 3 corners is a triangle; 4 sides and 4 corners is a quadrilateral (squares and rectangles are quadrilaterals too); 5 is a pentagon; 6 is a hexagon. "Does turning the shape or making it bigger change its name?" (No.) Then hold up the cube: pairs count its flat faces (6, all squares the same size) and its corners (8). Each child draws a shape with 5 corners on dot paper and a partner checks it is a pentagon.

2. **Making new shapes (8 min).** With pattern blocks: "Put 2 triangles together to make a shape with 4 sides." (A rhombus, which is a quadrilateral.) "Can you cover a trapezoid with triangles?" (Yes, 3.) "Can you cover the hexagon with triangles?" (Yes, 6.) "With trapezoids?" (Yes, 2.) Pairs lay the pieces on top of the hexagon to check, then count the sides of each new shape they make.
3. **A shape bar graph (12 min).** Each pair tips out its shape bag and sorts the shapes into four rows by name, one card for each shape, lined up at the left like a picture graph. Then they make a bar graph on squared paper: one square for each shape, filled in or covered with a card square, with the four names written along the bottom. Ask:
    - "How many shapes altogether?" (5 + 7 + 3 + 4 = 19.)
    - "Which shape is there least of?" (Pentagons.)
    - "How many more quadrilaterals than pentagons?" (7 - 3 = 4.)
    - "How many triangles and hexagons together?" (5 + 4 = 9.)

✓ Discussion questions (with answers)

- Is a square a quadrilateral? Yes: it has 4 sides and 4 corners.
- A shape has 6 sides but they are not all the same length. Is it a hexagon? Yes: it has 6 sides and 6 corners.
- Why do the bars start at the same line? So we can compare them fairly, just like lining up strips at one end before measuring.

✓ Closing check (10 min, with answers)

Hold up a pentagon with sides of different lengths. "What is this shape?" (A pentagon: 5 sides and 5 corners.) "Draw a shape with 4 corners. What is it called?" (A quadrilateral.) Show the boats bar graph. "How many boats altogether?" (10.) "How many more rowing boats than canoes?" (3.) Note who counts sides carefully and who names shapes by how they look.

Vocabulary

side, corner, triangle, quadrilateral, pentagon, hexagon, cube, face, rhombus, trapezoid, bar graph, picture graph, altogether, how many more

Differentiation

- **Support:** sort triangles and quadrilaterals first, then add the other shapes. Put a small sticker on each corner as it is counted.
- **Stretch:** count the edges of the cube (12). "How many triangles would cover 2 hexagons?" (12.)
- Children who are blind or have low vision feel the sides and corners of the card shapes and pattern blocks, and read the bar graph by feeling the raised card squares in each bar.

⚠ Safety

Use pattern blocks and cubes too large to swallow. Cubes stay on tables.

Teacher notes and misconceptions

- Many children think a shape turned on its corner is a different shape (a square "becomes a diamond"). Turn shapes and ask "Did the number of sides change?"
- Some children only call a shape a hexagon if all its sides are the same. Show irregular hexagons often.
- Counting corners on a shape with many sides is easy to get wrong; touching each corner, or putting a small sticker on it, helps.
- Line plots, splitting rectangles into rows of squares, and halves, thirds and fourths are not taught in this unit (see Known gaps in the unit overview).

Grade 3 Mathematics: Equal Groups and Arrays (5 lessons, about 4 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 11 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check activities against your school's rules.
>
> Text-checked by three other agents (Gemini 3.8 Flash, Gemini 4 Argon and Gemini 4 Carbon); see Known gaps.

Back to the grade 3 year plan - Term 1. Builds on grade 2: Adding and taking away within 100 and Hundreds, tens and ones to 1000

Big idea

When things come in equal groups, we can find the total without counting every one: 5 groups of 7 is 5 × 7. Putting the groups in rows makes an array, and turning an array round shows that 5 × 7 and 7 × 5 give the same total. Dividing works the other way: sharing 24 into 4 equal groups, or making groups of 4 from 24, and both can be found by asking "4 times what is 24?"

Outcomes

By the end of the unit most children can:

1. Read, write, compare and order numbers to 1000, and add or take away within 1000 with a method they can explain using hundreds, tens and ones.
2. Describe a collection of equal groups as "5 groups of 7" and write it as 5 × 7, and tell a short story that fits a multiplication like 5 × 7.
3. Build and draw arrays, write a multiplication for an array, and explain why turning an array round does not change the total (4 × 6 = 6 × 4).
4. Solve a division in both ways, sharing (24 shared into 4 equal groups is 6 in each group) and grouping (24 put into groups of 4 makes 6 groups), and write it as 24 ÷ 4 = 6.
5. Solve one-step story problems with equal groups and arrays within 100, and find the missing number in sentences like 8 × □ = 48 or □ = 18 ÷ 3.

Prior knowledge

The grade 2 units: hundreds, tens and ones to 1000; adding and taking away within 100 using tens and ones; skip-counting in 2s, 5s, 10s and 100s; odd and even numbers; and finding the total of a small array by adding equal rows (for example 4 + 4 + 4). Children still building these can use numbers to 30 and groups of 2, 5 and 10 in every lesson.

Lessons

Each lesson is about 45 minutes: a short whole-class start, paired work with counters or cubes, and a closing check. Split a lesson over two days if needed; the unit runs over about 4 weeks, so

each idea should come back in short daily practice (5 minutes of skip-counting, one array or one story problem).

1. Hundreds, tens and ones: a check of grade 2
2. Equal groups and the times sign
3. Arrays, and turning them round
4. Dividing: sharing and grouping
5. Story problems and missing numbers

Materials (whole class unless noted)

- Counters or linking cubes too large to swallow, about 60 per pair (every lesson), in two colours or two kinds of object so colour is not the only clue.
- Place-value blocks or bundles per pair: 6 hundreds (flats or ten towers of ten), 15 tens and 20 ones (lesson 1). Straw bundles wrapped with tape (no rubber bands, which may contain latex) work as well.
- A hundreds-tens-and-ones mat per pair, with raised lines (glued string) between the columns (lesson 1).
- Six paper plates or small trays per pair, for groups (lessons 2 and 4).
- Squared paper, 1 cm or larger, and a large-print or raised-line version (lessons 3 and 5); a sheet of card per pair for covering part of an array (lesson 3).
- A 10 by 10 pegboard or egg boxes per pair as an optional tactile array (lesson 3).
- Two sets of digit cards 0 to 9 per pair, so children can build and point to answers (every lesson).
- Story-problem cards for lesson 5 (see lesson 5), with a small picture on each card.
- Whiteboards and pens, or paper and pencils, for drawings and number sentences.

⚠ Safety and access

- Use counters and cubes too large to swallow; no rubber bands.
- Plates or trays, cube towers and raised lines let children who are blind or have low vision feel each group and each row; pegboards or egg boxes make arrays tactile.
- Pointing to digit cards, moving counters, sign, writing or a communication device all count as answers. Story problems are read aloud, so reading is not what is being checked.
- No public timing, races or times-table tests. Knowing products from memory is an end-of-year aim; this unit is about what multiplying and dividing mean.

Assessment

Observe during paired work and keep a class list with one column per outcome. A one-to-one check (about 5 minutes per child) during the fourth week:

- "What is 345 + 278? How did you work it out?" (623: 3 hundreds and 2 hundreds are 5 hundreds; 4 tens and 7 tens are 11 tens; 5 ones and 8 ones are 13 ones, which is 1 ten and 3 ones; so 6 hundreds, 2 tens and 3 ones.)
- Show 4 plates with 3 counters on each. "How many groups? How many in each group? Write it as a times sentence." (4 groups of 3; 4 × 3 = 12.)
- Show an array of 3 rows of 6. "Write a times sentence for it. What if I turn it round?" (3 × 6 = 18; turned round it is 6 rows of 3, 6 × 3 = 18, the same counters.)

- "Share 20 counters equally onto 5 plates. How many on each?" (4; 20 ÷ 5 = 4.) "Now put 20 counters into groups of 5. How many groups?" (4; 20 ÷ 5 = 4.)
- "Hen puts 6 eggs in each box. Hen fills 4 boxes. How many eggs?" (24; 4 × 6 = 24.) "What number goes in the box: 7 × □ = 35?" (5.)

Record yes, with help or not yet for each part. A child who gets the right total by counting in ones has the answer but not yet the equal-groups idea; note that rather than marking it wrong.

Sources

- Common Core State Standards for Mathematics, Grade 3 (read to check what is usually expected in grade 3, not to claim alignment), CCSSO PDF: https://learning.ccsso.org/wp-content/uploads/2022/11/Math_Standards1.pdf
  - Page 21, grade 3 introduction: the first critical area is "developing understanding of multiplication and division and strategies for multiplication and division within 100".
  - Page 23, 3.OA.A.1: "Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each."
  - 3.OA.A.2: interpret 56 ÷ 8 "as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each."
  - 3.OA.A.3: "Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities".
  - 3.OA.A.4: "Determine the unknown whole number in a multiplication or division equation relating three whole numbers."
  - 3.OA.B.5: "Apply properties of operations as strategies to multiply and divide", with the footnote "Students need not use formal terms for these properties."
  - 3.OA.B.6: "Understand division as an unknown-factor problem."
  - Page 24, 3.NBT.A.2: "Fluently add and subtract within 1000 using strategies and algorithms based on place value".

Known gaps and cautions

- 3.OA.C.7 (by the end of grade 3, know from memory all products of two one-digit numbers) is a whole-year aim; this unit starts it with skip-counting in 2s, 3s, 4s, 5s and 10s, and the year plan puts more times-table facts in term 2.
- Measurement quantities in story problems (3.OA.A.3), two-step problems (3.OA.D.8), the grouping property (associative) and splitting a times fact (distributive) are left for later terms. Rounding to the nearest 10 or 100 (3.NBT.A.1) is not taught here.
- Lesson 1 is a check of grade 2 work, not new teaching; if most children are secure, it can be shortened to one short session.
- The word "commutative" is the teacher's; children only need the idea and may say "turning it round". Children do learn the word "array".
- The names in story problems (Hen, Goat, Bear, Duck, Mouse, Crab) are the made-up Little Hill characters used in other units. Swap in names and objects that suit your class, but avoid real children's belongings or families.
- The lesson order, timings and examples are my choice, not taken from a source.
- Three other agents (Gemini 3.8 Flash at 4f59beb, reporting no errors; Gemini 4 Argon at 4f59beb and 4720d19, and Gemini 4 Carbon at 4720d19, each reporting the same two material-count errors) text-checked this unit on 2026-11-11. The errors (too few place-value blocks for 345 + 278, and 50 counters for 6 groups of 10) were fixed in ea1b95b, and Gemini 4 Argon and Gemini 4 Carbon re-checked that fix the same day and reported no

remaining errors. Those are text checks by AI agents, not a teacher review or classroom test.

Lesson 1: Hundreds, tens and ones: a check of grade 2

Unit overview - Next: Lesson 2

About 45 minutes.

Goal

Children show three-digit numbers with hundreds, tens and ones, compare them, and add or take away within 1000 with a method they can explain. This lesson checks the grade 2 work before multiplication starts; the teacher notes who needs more practice.

Materials

- Place-value blocks or bundles per pair: 6 hundreds, 15 tens and 20 ones.
- A hundreds-tens-and-ones mat per pair, with raised lines between the columns.
- Two sets of digit cards 0 to 9 per pair.
- Counters or linking cubes, for children who prefer to use them for ones.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Skip-counting. The class counts together in 10s from 40 to 150, then in 100s from 100 to 1000, then in 5s from 0 to 60. Children who prefer can tap the table or hold up digit cards instead of speaking.

✎ Main activity (32 min)

1. **Build and compare (10 min).** The teacher says a number; pairs build it on the mat with blocks, then make it with digit cards. Use 345, 278, 406 and 460. Ask: "Which is bigger, 406 or 460?" (460: both have 4 hundreds, and 6 tens is more than 0 tens.) "Put 345, 278 and 406 in order, smallest first." (278, 345, 406.)
2. **Add with blocks (12 min).** Pairs build 345 and 278 and push them together. Ones: 5 + 8 = 13, so swap 10 ones for 1 ten, leaving 3 ones. Tens: 4 + 7 + 1 = 12 tens, so swap 10 tens for 1 hundred, leaving 2 tens. Hundreds: 3 + 2 + 1 = 6. Total 623. Then pairs do 156 + 238 (394; one swap of ones) on their own and write how they did it in numbers or a drawing.
3. **Take away with blocks (10 min).** Pairs build 532 and take away 217. There are only 2 ones, so swap 1 ten for 10 ones (12 ones); 12 - 7 = 5 ones; 2 - 1 = 1 ten; 5 - 2 = 3 hundreds. Answer 315. Check by adding: 315 + 217 = 532. Then 400 - 150 (250) for pairs who are ready.

✓ Discussion questions (with answers)

- Why do we swap 10 ones for 1 ten? Ten ones and one ten are the same amount; the swap keeps the number the same but makes it easier to read.
- How can adding check a take-away? If 532 - 217 = 315, then 315 + 217 must make 532 again.
- Is 406 the same as 460? No: 406 has no tens and 6 ones; 460 has 6 tens and no ones.

✓ Closing check (8 min, with answers)

Each child answers on a whiteboard, with digit cards or by pointing on the mat: "Show 507 with blocks" (5 hundreds, 0 tens, 7 ones); "Which is bigger, 389 or 398?" (398); "345 + 278" (623). One child at a time quietly tells the teacher how they did the adding.

Vocabulary

hundreds, tens, ones, digit, swap (exchange), compare, add, take away

Differentiation

- **Support:** work within 100 with tens and ones only, then add hundreds.
- **Stretch:** find two different three-digit numbers that add to 623 with one swap, and explain how you know.
- The mat's raised lines let children feel the columns. Blocks can be counted by touch; digit cards can be read aloud by a partner or made in large print or braille.

⚠ Safety

Use blocks and counters too large to swallow. Tape bundles rather than using rubber bands, which may contain latex.

Teacher notes and misconceptions

- Some children read 406 as "forty-six". Building it with blocks and leaving the tens column empty helps them see the zero.
- Taking the smaller digit from the larger in each column (writing 532 - 217 as 325) is a common mistake. Checking by adding shows it is wrong.

Lesson 2: Equal groups and the times sign

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 45 minutes.

Goal

Children make equal groups, describe them as "4 groups of 3", write them as 4 × 3, find the total by skip-counting or repeated adding, and tell a short story that fits a multiplication.

Materials

- Six paper plates or small trays per pair.
- Counters or linking cubes, about 60 per pair, in two colours or two kinds of object.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Skip-counting in 2s to 20, in 5s to 50 and in 10s to 100. Children can say the numbers, tap them, or hold up digit cards.

✎ Main activity (32 min)

1. **Groups of (10 min).** The teacher puts 3 counters on each of 4 plates. "How many plates? How many on each plate?" Children say "4 groups of 3". Count in 3s together, touching each plate: 3, 6, 9, 12. Write 3 + 3 + 3 + 3 = 12, then show the short way: 4 × 3 = 12, read as "4 groups of 3" or "4 times 3". Then put 3 counters on one plate and 5 on another and ask: "Is this equal groups?" (No; the groups are not the same size.)

2. **Make it, write it (12 min).** Pairs build each of these with plates and counters, find the total and write the multiplication:

   - 5 groups of 2 (5 × 2 = 10).
   - 3 groups of 5 (3 × 5 = 15).
   - 6 groups of 10 (6 × 10 = 60).
   - 4 groups of 4 (4 × 4 = 16).

   Then the teacher writes 2 × 6 and pairs build it (2 plates of 6 = 12).

3. **Story time (10 min).** The teacher tells an example story, not from a source: "Duck has 3 baskets. Each basket has 5 apples. How many apples?" (3 × 5 = 15.) Pairs pick a multiplication from step 2 and make up their own short story about Little Hill characters, telling it aloud, drawing it or acting it with counters. The partner builds the story with plates to check it fits.

✓ Discussion questions (with answers)

- What makes groups "equal"? Every group has the same number of things.
- In 4 × 3, what does the 4 tell us and what does the 3 tell us? In this lesson, 4 is the number of groups and 3 is the number in each group.
- Why is 6 × 10 quick to work out? Counting in 10s six times is 10, 20, 30, 40, 50, 60.

✓ Closing check (8 min, with answers)

The teacher puts 3 counters on each of 4 plates in front of each child (or pair) in turn. The child says or shows how many groups (4), how many in each (3), the total (12) and the multiplication (4 × 3 = 12), with digit cards or on a whiteboard. Then: "Write 5 groups of 2 with the times sign" (5 × 2 = 10).

Vocabulary

equal groups, groups of, times, multiply, total, skip-count

Differentiation

- **Support:** use groups of 2, 5 and 10 only, and count every counter if needed before skip-counting.
- **Stretch:** find all the ways to put 12 counters into equal groups (1 × 12, 2 × 6, 3 × 4, 4 × 3, 6 × 2, 12 × 1).
- Plates with raised rims let children feel each group. Stories can be told, signed, drawn or acted; the child's own way counts.

⚠ Safety

Use counters too large to swallow.

Teacher notes and misconceptions

- Some children add the two numbers (4 × 3 = 7). Going back to plates and counters, and saying "4 groups of 3", usually fixes this.
- Different books read 4 × 3 as "4 groups of 3" or "3, 4 times". This unit uses "groups of" first; lesson 3 shows that both orders give the same total.

Lesson 3: Arrays, and turning them round

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 45 minutes.

Goal

Children build and draw arrays, write a multiplication for an array, and explain why turning an array round gives the same total, so 4 × 6 = 6 × 4.

Materials

- Counters or linking cubes, about 60 per pair, in two colours or two kinds of object.
- Squared paper, 1 cm or larger, and a large-print or raised-line version.
- A sheet of card per pair, for covering part of an array.
- Optional: a 10 by 10 pegboard or egg boxes per pair, as a tactile array.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Skip-counting in 3s to 30 and in 4s to 40, together. Children can say, tap or show the numbers with digit cards.

✎ Main activity (32 min)

1. **Rows of (10 min).** The teacher builds 3 rows of 6 counters. "How many rows? How many in each row?" This is an array: equal groups set out in rows. Count in 6s along the rows: 6, 12, 18, so 3 × 6 = 18. Now turn the whole array a quarter turn. "How many rows now? How many in each?" (6 rows of 3.) Count in 3s: 3, 6, 9, 12, 15, 18. Same counters, same total: 6 × 3 = 18.

2. **Build, turn and draw (12 min).** Pairs build each array, write both multiplications, then colour it on squared paper:

    - 2 rows of 5 (2 × 5 = 10 and 5 × 2 = 10).
    - 4 rows of 6 (4 × 6 = 24 and 6 × 4 = 24).
    - 3 rows of 7 (3 × 7 = 21 and 7 × 3 = 21).

    Children can use the pegboard or egg boxes instead of counters.

3. **What's under the card? (10 min).** One child builds an array and hides it under the card, then slides the card to show just one row and says how many rows there are. The partner works out the total (for example, one row of 5 showing and 4 rows altogether: 4 × 5 = 20), then lifts the card to check by counting. Swap roles.

✓ Discussion questions (with answers)

- Why does turning an array round not change the total? No counters are added or taken away; they are only looked at another way.
- If you know 3 × 7 = 21, what else do you know? 7 × 3 = 21.
- Is 5 × 2 the same as 5 + 2? No: 5 × 2 is 5 groups of 2, which is 10.

✓ Closing check (8 min, with answers)

Each child builds 3 rows of 6 (or the teacher builds it in front of them). The child says or shows the multiplication (3 × 6 = 18), then turns it round and gives the other one (6 × 3 = 18), with digit cards, a whiteboard or by pointing. Then: "2 × 9 = 18. What is 9 × 2?" (18).

Vocabulary

array, row, column, turn round, multiply, same total

Differentiation

- **Support:** use arrays with rows of 2, 5 or 10 and count along each row.
- **Stretch:** find every array that uses exactly 24 counters (1 × 24, 2 × 12, 3 × 8, 4 × 6 and each one turned round).
- The pegboard, egg boxes and raised-line squared paper let children feel rows and columns. Counters come in two colours or two kinds, so colour is not the only clue when rows are marked.

⚠ Safety

Use counters and pegs too large to swallow.

Teacher notes and misconceptions

- The idea that order does not change the answer is called the commutative property. This is the teacher's word only; the standards say children need not use formal terms for these properties.
- Some children count every counter each time. Ask them to count one row, then skip-count by rows.

Lesson 4: Dividing: sharing and grouping

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 45 minutes.

Goal

Children solve a division in two ways, sharing (how many in each group?) and grouping (how many groups?), write it with the division sign, and link it to a multiplication they know.

Materials

- Six paper plates or small trays per pair.
- Counters or linking cubes, about 60 per pair, in two colours or two kinds of object.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Quick multiplication from lesson 3: the teacher says "4 rows of 6"; children show the total (24) with digit cards, fingers or a whiteboard. Repeat with 3 rows of 5 (15) and 2 rows of 10 (20).

✎ Main activity (32 min)

1. **Sharing (10 min).** The teacher puts out 4 plates and 24 counters. "Share these fairly onto 4 plates." Deal one at a time onto each plate until none are left. Each plate has 6. Write 24 ÷ 4 = 6, read as "24 shared into 4 groups is 6 in each". Pairs then share 15 onto 3 plates (5 each) and 20 onto 5 plates (4 each).
2. **Grouping (10 min).** Start again with 24 counters, but now the question is different: "Put them in groups of 4. How many groups?" Make groups of 4 on plates until none are left: 6 groups. Write 24 ÷ 4 = 6 again, read as "24 in groups of 4 makes 6 groups". Pairs then make groups of 5 from 20 (4 groups) and groups of 2 from 12 (6 groups).
3. **Times or divide? (12 min).** For each division pairs find the answer both ways if they can, and write the multiplication that checks it:

    - 20 ÷ 5 = 4, because 5 × 4 = 20.
    - 18 ÷ 3 = 6, because 3 × 6 = 18.
    - 30 ÷ 10 = 3, because 10 × 3 = 30.
    - 16 ÷ 4 = 4, because 4 × 4 = 16.

    Then ask: "24 ÷ 4: what number times 4 makes 24?" (6.)

✓ Discussion questions (with answers)

- What is different about sharing and grouping? In sharing we know how many groups and find how many in each; in grouping we know how many in each and find how many groups.
- Why do both give the same answer for 24 ÷ 4? Both are about the same array: 4 groups of 6 and 6 groups of 4 both make 24.
- How can multiplying check a division? If 18 ÷ 3 = 6, then 3 × 6 must make 18.

✓ Closing check (8 min, with answers)

Each child (or pair, with the teacher watching) is given 20 counters and 5 plates. "Share 20 onto 5 plates. How many on each?" (4.) Then "Put 20 in groups of 5. How many groups?" (4 groups.) The child shows 20 ÷ 5 = 4 with digit cards or on a whiteboard.

Vocabulary

share, fairly, equal groups, divide, division sign, how many in each, how many groups

Differentiation

- **Support:** divide numbers to 20 by 2, 5 and 10, dealing one counter at a time.
- **Stretch:** share 13 counters onto 4 plates and explain what happens (3 each, with 1 left over; leftovers come in a later grade).
- Plates with raised rims let children feel each group. Children can deal counters by touch and count each plate aloud or by signing.

⚠ Safety

Use counters too large to swallow.

Teacher notes and misconceptions

- The same sign, ÷, is used for sharing and grouping. Children do not need to name which one they used, but should be able to show either with counters.
- Some children think the bigger number must go second (4 ÷ 24). Reading it aloud as "24 shared into 4" helps.

Lesson 5: Story problems and missing numbers

Unit overview - Previous: Lesson 4

About 45 minutes.

Goal

Children solve one-step story problems with equal groups and arrays within 100, choosing to multiply or divide, and find the missing number in sentences like 8 × □ = 48 or □ = 18 ÷ 3.

Materials

- Story-problem cards per pair, each with a small picture and the answer written small on the back. Six cards (examples written for this unit, not from a source; the characters live in the made-up town of Little Hill):
    1. Hen has 4 boxes. Each box holds 6 eggs. How many eggs?
    2. Goat plants carrots in 3 rows with 8 in each row. How many carrots?
    3. Bear shares 30 berries onto 5 plates. How many berries on each plate?
    4. Duck puts 28 crackers into bags of 4. How many bags?
    5. Mouse sets out 5 rows of chairs with 9 in each row. How many chairs?
    6. Crab has 40 shells and puts 10 in each bucket. How many buckets?
- Counters or linking cubes, about 60 per pair, in two colours or two kinds of object.
- Squared paper, 1 cm or larger, and a large-print or raised-line version.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

The teacher says a fact; children show the answer with digit cards, fingers or a whiteboard: 5 × 3 (15), 2 × 8 (16), 20 ÷ 4 (5), 10 × 7 (70).

✎ Main activity (32 min)

1. **Solve together (8 min).** Read card 1 aloud. "Is it equal groups? How many groups? How many in each?" (4 groups of 6.) Children solve it with counters, a drawing or skip-counting: 4 × 6 = 24 eggs. Then read card 3: "Do we know how many groups, or how many in each?" (5 groups; find how many in each), so 30 ÷ 5 = 6 berries.
2. **Story cards (14 min).** Pairs solve the other cards in any order, using counters, squared paper or a drawing, and write the number sentence. Answers: card 2, 3 × 8 = 24 carrots; card 4, 28 ÷ 4 = 7 bags; card 5, 5 × 9 = 45 chairs; card 6, 40 ÷ 10 = 4 buckets. The partner checks the back. A partner can read the cards aloud.

3. **Missing numbers (10 min).** The teacher writes a sentence with a box. Pairs find the missing number with counters or arrays and show it with digit cards:
    - 8 × □ = 48 (6).
    - 4 × □ = 20 (5).
    - □ × 3 = 27 (9).
    - □ = 18 ÷ 3 (6).
    - 35 ÷ 7 = □ (5).

    Ask: "How can a times fact help with 8 × □ = 48?" (Count in 8s until you reach 48: 8, 16, 24, 32, 40, 48 is six 8s.)

✓ Discussion questions (with answers)

- How do you know whether to multiply or divide? If we know how many groups and how many in each, we multiply to find the total; if we know the total and one of the others, we divide.
- What does the box mean in 8 × □ = 48? It stands for a number we do not know yet; here it is 6.
- Is card 2 about groups or an array? An array: rows of carrots. Rows work just like groups.

✓ Closing check (8 min, with answers)

One child at a time, with the teacher. The teacher reads aloud: "Hen has 4 boxes with 6 eggs in each. How many eggs?" (24.) Then shows 7 × □ = 35 and asks for the missing number (5). The child answers by saying, signing, pointing to digit cards, writing or using counters, and shows or tells how they got it.

Vocabulary

story problem, number sentence, multiply, divide, missing number, unknown

Differentiation

- **Support:** use cards 1, 3 and 6 with counters or a drawing; missing numbers with 2, 5 and 10 only.
- **Stretch:** write a story card of your own for 6 × 7 and one for 42 ÷ 6 (both use 42), and swap with another pair.
- Cards can be read aloud by a partner or made in large print or braille. Raised-line squared paper lets children feel rows of an array.

⚠ Safety

Use counters too large to swallow.

Teacher notes and misconceptions

- Children often look for a key word ("each", "share") instead of thinking about the story. Ask them to act it out or draw it first.
- Children may write 4 ÷ 28 for card 4. Reading it aloud as "28 in bags of 4" helps.
- Fluency with all times facts within 100 is a whole-year aim; keep up short daily practice after this unit.

Grade 3 Mathematics: Fractions (5 lessons, about 4 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 12 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check activities against your school's rules.
>
> Text-checked by two other agents (Gemini 3.8 Flash and Gemini 4 Argon); see Known gaps.

Back to the grade 3 year plan - Term 2. Builds on grade 2 Measuring, time, money and shapes (halves, thirds and fourths of shapes) and grade 3 Equal groups and arrays

Big idea

A fraction is a number made from equal parts of one whole. Split a strip into 4 equal parts and each part is one quarter, written 1/4; three of those parts make 3/4. Fractions sit on the number line between whole numbers, two fractions can name the same amount (1/2 = 2/4), and we can only compare fractions fairly when they are parts of the same whole.

Outcomes

By the end of the unit most children can:

1. Explain that a fraction needs equal parts of one whole, and name one half, one third, one quarter, one sixth and one eighth (1/2, 1/3, 1/4, 1/6, 1/8) of a strip or a shape.
2. Build, read and write fractions such as 3/4 as "3 parts of size 1/4", and know that 4/4 is one whole and that 3 wholes can be written 3/1.
3. Place fractions on a number line from 0 to 1, and from 0 to 2 in quarters, by marking off equal lengths from 0.
4. Compare two fractions with the same top number or the same bottom number, write the result with >, < or =, explain it with strips, and say why the comparison only works when both fractions are parts of the same whole.
5. Find simple equal fractions, such as 1/2 = 2/4 and 2/3 = 4/6, and show why with strips or a number line.
6. Give more times-table facts within 100 (2s, 3s, 4s, 5s, 6s, 8s and 10s), from memory or with a quick strategy such as doubling.

Prior knowledge

The grade 2 shapes lesson: splitting circles and rectangles into two, three or four equal shares and calling them halves, thirds and fourths. The grade 3 term 1 unit: equal groups, arrays and skip-counting in 2s, 3s, 4s, 5s and 10s. Children who are not yet secure can work with halves and quarters only in every lesson.

Lessons

Each lesson is about 45 minutes: a 5-minute times-table start, paired work with paper strips or fraction strips, and a closing check. Split a lesson over two days if needed; the unit runs over

about 4 weeks, so each idea should come back in short daily practice (one times-table fact, one fraction to build or one comparison).

1. Equal parts and unit fractions
2. Counting in unit fractions
3. Fractions on a number line
4. Comparing fractions
5. Equal fractions and fraction stories

Materials (whole class unless noted)

- Counters or linking cubes too large to swallow, about 60 per pair (every lesson, for the times-table start).
- Two sets of digit cards 0 to 9 per pair (every lesson).
- Whiteboards and pens, or paper and pencils (every lesson).
- Plain paper strips 24 cm long and about 4 cm wide, 5 per child, two of them pre-marked with pencil lines in thirds (every 8 cm) and sixths (every 4 cm) (lesson 1).
- Paper squares about 15 cm across, 3 per child (lesson 1) and 1 more per child (lesson 5).
- Three check strips made by the teacher, each 24 cm long, with the lines drawn in thick marker and gone over with glued string so they can be felt (lesson 1, and the assessment): strip A split into 4 equal parts with one part marked by a shaded square and a sticker; strip B split into 4 parts of different sizes; strip C split into 3 equal parts.
- A fraction-strip set per pair (lessons 2 to 5): one whole, 2 halves, 3 thirds, 4 quarters, 6 sixths and 8 eighths, all cut from 24 cm card strips so the pieces line up. Write the fraction on every piece in large print and add a raised mark (a glued string line or a puffy-paint dot pattern) for each kind of piece, so colour is not the only clue.
- Three extra whole card strips, 24 cm long, per pair (lesson 2).
- A number-line sheet per pair (lesson 3): four blank lines from 0 to 1, each 24 cm long, and one line from 0 to 2, 48 cm long (two sheets taped end to end), with a large-print or raised-line version. Rulers and pencils.
- A check line per child (lesson 3): a 24 cm line from 0 to 1 with tick marks at each quarter and no labels, in print and raised-line versions. One more check line marked in thirds, for the assessment.
- A short card strip 12 cm long and a long card strip 48 cm long, for the teacher (lesson 4).
- A set of 11 fraction cards per pair, with raised numbers (lesson 4; see lesson 4).
- Large >, < and = cards per pair, with raised outlines (lessons 4 and 5).
- Six story cards for lesson 5 (see lesson 5), each with a small picture.

⚠ Safety and access

- Use counters and cubes too large to swallow. Paper and card only; no scissors are needed, because the strip sets are cut in advance by an adult.
- Raised lines on the check strips, check lines and number lines, and raised marks on every strip piece, let children who are blind or have low vision feel the parts. Laying pieces end to end is a way to compare by touch.
- Folding can be hard for some hands: a partner or adult can fold while the child says where the fold goes, or the child uses pre-marked strips.
- Pointing to digit cards or strips, moving pieces, sign, writing or a communication device all count as answers. Story cards are read aloud, so reading is not what is being checked.

- No public timing, races or times-table tests. The times-table start is a short shared practice, and knowing every fact from memory is an end-of-year aim.
- No real food: the loaves, crackers and cakes in story cards are pretend.

Assessment

Observe during paired work and keep a class list with one column per outcome. A one-to-one check (about 5 minutes per child) during the fourth week, with the fraction-strip set, digit cards and the comparison cards to hand:

- Show check strips A and B. "Which strip shows quarters? Why not the other one?" (Strip A: its 4 parts are equal. Strip B has 4 parts, but they are not the same size.)
- "Build 5/6 with your strips. How many sixths make one whole? What is 4/4 the same as?" (5 sixth pieces; 6; one whole.)
- Give the check line in thirds. "Point to where 2/3 goes." (The second tick from 0.)
- "Which is bigger, 3/8 or 3/4? Put the sign between them." (3/4 is bigger: 3/8 < 3/4, because eighths are smaller pieces than quarters.)
- "Use quarter pieces to make a fraction equal to 1/2." (2/4.)
- "What is 4 × 6? What is 8 × 6? How did you work it out?" (24; 48, for example by doubling 24.)

Record yes, with help or not yet for each part. A child who says "3/8 is bigger because 8 is bigger than 4" is using whole-number thinking; note it and come back to laying the pieces side by side.

Sources

- Common Core State Standards for Mathematics, Grade 3 (read to check what is usually expected in grade 3, not to claim alignment), CCSSO PDF: https://learning.ccsso.org/wp-content/uploads/2022/11/Math_Standards1.pdf
  - Page 21, grade 3 introduction: the second critical area is "developing understanding of fractions, especially unit fractions (fractions with numerator 1)", and "Students understand that the size of a fractional part is relative to the size of the whole."
  - Page 24, 3.NF.1: "Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b."
  - 3.NF.2: "Understand a fraction as a number on the number line; represent fractions on a number line diagram."
  - 3.NF.3a: "Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line."
  - 3.NF.3b: "Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3."
  - 3.NF.3c: "Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers."
  - 3.NF.3d: "Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole."
  - Page 24, footnote 5: "Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8."
  - Page 26, 3.G.2: "Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole."

    - Page 23, 3.OA.C.7: "By the end of Grade 3, know from memory all products of two one-digit numbers."

Known gaps and cautions

- Times-table facts get only the 5-minute start of each lesson. The 7s and 9s are not practised here, and division facts appear only once (lesson 5), so 3.OA.C.7 still needs daily practice through the rest of the year.
- Splitting shapes into equal areas (3.G.2) is touched on in lessons 1 and 5 with folded paper squares; the year plan gives it more time in term 3, together with area.
- Fractions greater than one go only as far as 8/4 on the 0-to-2 line. Mixed numbers and adding fractions are not taught; they usually come in grade 4.
- Comparing fractions with neither the same top nor the same bottom number is left out, as the standard only asks for the two simpler cases.
- "Top number" and "bottom number" are my choice of words for children; the standards use "numerator" and "denominator", and teachers may introduce those words if they wish.
- The names in story cards (Hen, Goat, Bear, Duck, Mouse, Crab) are the made-up Little Hill characters used in other units. Swap in names and objects that suit your class.
- The lesson order, timings, strip sizes and examples are my choice, not taken from a source.
- Two other agents text-checked this unit on 2026-11-12 and reported no errors: Gemini 3.8 Flash (at 0b7f2b9) and Gemini 4 Argon (at 8c474d7). Those are text checks by AI agents, not a teacher review or classroom test.

Lesson 1: Equal parts and unit fractions

Unit overview - Next: Lesson 2

About 45 minutes.

Goal

Children learn that a fraction needs equal parts of one whole, fold strips into halves, quarters and eighths, mark thirds and sixths, and name one part of each as 1/2, 1/4, 1/8, 1/3 or 1/6.

Materials

- Counters or linking cubes, about 60 per pair.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.
- Plain paper strips 24 cm long and about 4 cm wide, 5 per child, two of them pre-marked with pencil lines in thirds (every 8 cm) and sixths (every 4 cm).
- Paper squares about 15 cm across, 3 per child.
- Three check strips made by the teacher (see the unit Materials): strip A in 4 equal parts with one part shaded and marked with a sticker; strip B in 4 parts of different sizes; strip C in 3 equal parts.

Steps

✎ Opening (5 min)

Times-table start: the 2s. "Two times a number is double the number." Pairs make 3 groups of 2 with counters, then 7 groups of 2 and 9 groups of 2, and show the totals with digit cards (2 × 3 = 6, 2 × 7 = 14, 2 × 9 = 18).

✎ Main activity (32 min)

1. **Is it fair? (8 min).** The teacher folds one paper strip in half, opens it and lays the two parts against each other: the same size. Each part is one half, written 1/2. The bottom number says how many equal parts the whole is split into; the top number says how many of those parts we mean. Now show check strip B. "This strip has 4 parts. Is each part a quarter?" (No: the parts are not the same size.) Then strip A: "Is each part a quarter now?" (Yes: 4 equal parts.)

2. **Fold and name (14 min).** Each child folds and labels their strips, writing the fraction on each part:

    - Fold once: 2 equal parts, each 1/2.
    - Fold in half, then in half again: 4 equal parts, each 1/4.
    - Fold in half three times: 8 equal parts, each 1/8.
    - On the strip marked in thirds, fold along the lines: 3 equal parts, each 1/3.
    - On the strip marked in sixths, fold along the lines: 6 equal parts, each 1/6.

Children line the strips up and say what they notice. (The more parts the whole is split into, the smaller each part is.)

3. **Same square, different quarters (10 min).** Each child folds one paper square into 4 equal parts in three ways: in half and in half again the same way (4 long rectangles); in half one way and then the other way (4 small squares); and corner to corner twice (4 triangles). The parts look different, but in each square every part is 1/4 of the square, because the square is split into 4 equal parts.

✓ Discussion questions (with answers)

- Which is bigger, 1/2 or 1/8 of the same strip? 1/2: the strip is split into fewer parts, so each part is bigger.
- If I cut a strip into 3 pieces of different sizes, is each piece a third? No: thirds have to be 3 equal parts.
- Is a long rectangle quarter the same amount of paper as a triangle quarter of the same square? Yes: each is 1 of 4 equal parts of the same square.

✓ Closing check (8 min, with answers)

Show the three check strips. Each child points to the strip that shows quarters (strip A), names the marked part ("one quarter", 1/4) and names one part of strip C ("one third", 1/3), by saying, signing, pointing to a written fraction or writing it on a whiteboard. Then: "2 × 7?" (14).

Vocabulary

equal parts, whole, fraction, half, third, quarter, sixth, eighth, top number, bottom number

Differentiation

- **Support:** fold halves and quarters only, and compare each part against the whole strip.
- **Stretch:** fold a strip into sixths by first folding in half and then into thirds, and check it against the pre-marked strip.
- Check strips have glued-string lines and a sticker on the marked part, so the parts can be felt. A partner or adult can fold while the child says where the fold goes.

⚠ Safety

Use counters too large to swallow. Paper only; no scissors.

Teacher notes and misconceptions

- Some children call any piece a "half", for example the bigger half. Keep asking "Are the parts equal?"

- Some children think 1/8 is bigger than 1/2 because 8 is bigger than 2. The folded strips are the answer: lay them side by side.
- The standards use "numerator" (top number) and "denominator" (bottom number). Use those words too if your school does.

Lesson 2: Counting in unit fractions

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 45 minutes.

Goal

Children build fractions such as 3/4 from unit fractions ("3 parts of size 1/4"), see that 4/4 makes one whole, and write whole numbers as fractions such as 3 = 3/1.

Materials

- Counters or linking cubes, about 60 per pair.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.
- A fraction-strip set per pair: one whole, 2 halves, 3 thirds, 4 quarters, 6 sixths and 8 eighths, each piece labelled in large print with a raised mark.
- Three extra whole card strips, 24 cm long, per pair.

Steps

✎ Opening (5 min)

Times-table start: the 4s, by doubling the 2s. "2 × 3 = 6, so 4 × 3 is double 6, which is 12." Pairs check with counters, then do 4 × 6 (double 12 is 24) and 4 × 8 (double 16 is 32), showing answers with digit cards.

✎ Main activity (32 min)

1. **Counting quarters (10 min).** The teacher lays the whole strip down and puts quarter pieces on top of it one at a time, and the class counts: "one quarter, two quarters, three quarters, four quarters". Write 1/4, 2/4, 3/4 and 4/4. "3/4 means 3 parts, and each part is 1/4." Four quarters cover the whole strip exactly, so 4/4 = 1.
2. **Build it (12 min).** Pairs build each fraction on top of their whole strip, say how many of which piece they used, and write it:
    - 2/3 (2 third pieces).
    - 5/6 (5 sixth pieces).
    - 3/8 (3 eighth pieces).
    - 6/6 (6 sixth pieces, which cover the whole: 6/6 = 1).
    - 2/2 (2 half pieces, which cover the whole: 2/2 = 1).
3. **Wholes as fractions (10 min).** Pairs lay their three extra whole strips in a row. "How many wholes?" (3.) "If each part is one whole, we have 3 parts of size one whole: 3/1." So 3 = 3/1. Ask: "What would 6/1 be?" (6 wholes, so 6.) "How many eighths make one whole?" (8, so 8/8 = 1.)

✓ Discussion questions (with answers)

- Is 4/4 more than, less than or the same as 1? The same: four quarters cover the whole.
- How many sixths make one whole? 6.
- What does the 3 in 3/8 tell us, and what does the 8 tell us? 3 is how many parts we have; 8 is how many equal parts make the whole.

✓ Closing check (8 min, with answers)

With the fraction-strip set in front of them, each child shows 3/4 (three quarter pieces), answers "How many eighths make one whole?" (8) and "What is 2/2 the same as?" (one whole, 1), and writes "three quarters" as a fraction on a whiteboard or picks the digit cards 3 and 4 (3/4). Then: "4 × 6?" (24).

Vocabulary

unit fraction, whole, three quarters, five sixths, count in quarters

Differentiation

- **Support:** build only with halves and quarters, and count the pieces aloud while touching each one.
- **Stretch:** "Which is more, 7/8 or one whole? How many more eighths would make one whole?" (one whole; 1 more eighth.)
- Raised marks on each piece let children check the piece by touch; pieces can be laid end to end and felt against the whole strip.

⚠ Safety

Use counters too large to swallow.

Teacher notes and misconceptions

- Some children read 3/4 as "three and four" or "three fours". Model the words "three quarters" every time.
- Some children think a fraction must always be less than 1. 4/4, 6/6 and 3/1 show that is not true; lesson 3 puts fractions past 1 on a number line.

Lesson 3: Fractions on a number line

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 45 minutes.

Goal

Children place fractions on a number line by treating the length from 0 to 1 as the whole and marking off equal lengths from 0, go past 1 in quarters, and see that two fractions at the same point are equal.

Materials

- Counters or linking cubes, about 60 per pair.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.
- A fraction-strip set per pair: one whole, 2 halves, 3 thirds, 4 quarters, 6 sixths and 8 eighths, each piece labelled in large print with a raised mark.
- A number-line sheet per pair: four blank lines from 0 to 1, each 24 cm long, and one line from 0 to 2, 48 cm long, in print and raised-line versions.
- Rulers and pencils.
- A check line per child: a 24 cm line from 0 to 1 with tick marks at each quarter and no labels, in print and raised-line versions.

Steps

✎ Opening (5 min)

Times-table start: the 10s and 5s. "5 times a number is half of 10 times it." 10 × 7 = 70, so 5 × 7 = 35; 10 × 4 = 40, so 5 × 4 = 20; then 6 × 5 = 30. Pairs show answers with digit cards and can check 5 × 4 with counters.

✎ Main activity (32 min)

1. **From strip to line (10 min).** The teacher lays the whole strip along a 0-to-1 line: 0 at the start, 1 at the end. "The whole is the distance from 0 to 1." Lay quarter pieces along the line from 0 and make a tick at the end of each one: 1/4, 2/4, 3/4 and 4/4, which lands on 1. "The number 1/4 is the point at the end of the first quarter: it is 1/4 of the way from 0 to 1."

2. **Make your own lines (14 min).** Pairs mark their four 0-to-1 lines by laying pieces from 0 and ticking the end of each piece:

    - Line 1 in halves: 1/2, 2/2.
    - Line 2 in quarters: 1/4, 2/4, 3/4, 4/4.
    - Line 3 in thirds: 1/3, 2/3, 3/3.
    - Line 4 in eighths: 1/8 to 8/8.

Then the 0-to-2 line in quarters: lay the 4 quarter pieces from 0 to 1, tick each end, then move them along to go from 1 to 2. Label 0, 1/4, 2/4, 3/4, 4/4 (also 1), 5/4, 6/4, 7/4, 8/4 (also 2). "5/4 is one quarter more than 1."

3. **Same point (8 min).** Pairs put the halves line under the quarters line with the 0s lined up. "What is at the same point as 1/2?" (2/4.) So 1/2 and 2/4 are equal: the same point on the line. Do the same with the quarters and eighths lines (1/4 and 2/8; 2/4 and 4/8). Also 4/4, 3/3 and 1 are all at the same point.

✓ Discussion questions (with answers)

- Where is 4/4 on the line? At 1.
- Is 5/4 more or less than 1? More: it is one quarter past 1.
- Which is further from 0, 1/3 or 1/8? 1/3, because thirds are longer pieces than eighths.

✓ Closing check (8 min, with answers)

Give each child a check line. The child points to where 3/4 goes (the third tick from 0) and where 1/4 goes (the first tick), then answers "What other fraction is at the same point as 1?" (4/4), by pointing, saying, signing or writing on a whiteboard. Then: "5 × 7?" (35).

Vocabulary

number line, point, tick mark, distance from 0, past 1, equal, same point

Differentiation

- **Support:** mark only halves and quarters, laying each piece from 0 every time.
- **Stretch:** on the 0-to-2 line, where would 3/2 go? (At 6/4, half way between 1 and 2.)
- Raised-line sheets let children feel each line and tick. Laying the strip pieces along the line works by touch as well as by sight.

⚠ Safety

Use counters too large to swallow. Rulers and pencils stay on the desk.

Teacher notes and misconceptions

- Some children write 1/4 at 0. Remind them that 0 is the start and 1/4 is the end of the first piece.
- Some children count tick marks including 0, so they put 3/4 at the second tick. Count the pieces (spaces), not the marks.
- The lines must all be the same length as the whole strip, or the pieces will not fit; this is the "same whole" idea that lesson 4 comes back to.

Lesson 4: Comparing fractions

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 45 minutes.

Goal

Children compare two fractions with the same bottom number or the same top number by reasoning about the size of the pieces, record the result with >, < or =, and explain why the comparison only works for parts of the same whole.

Materials

- Counters or linking cubes, about 60 per pair.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.
- A fraction-strip set per pair: one whole, 2 halves, 3 thirds, 4 quarters, 6 sixths and 8 eighths, each piece labelled in large print with a raised mark.
- Large >, < and = cards per pair, with raised outlines.
- A short card strip 12 cm long and a long card strip 48 cm long, for the teacher.
- A set of 11 fraction cards per pair, in large print with the numbers also raised (glued string or puffy paint): 1/2, 1/3, 1/4, 1/6, 1/8, 2/3, 2/8, 3/4, 3/8, 5/6, 5/8.

Steps

✎ Opening (5 min)

Times-table start: the 3s and 6s. "6 times a number is double 3 times it." 3 × 4 = 12, so 6 × 4 = 24; 3 × 7 = 21, so 6 × 7 = 42. Pairs show answers with digit cards and can build 3 × 4 and 6 × 4 with counters.

✎ Main activity (32 min)

1. **Same bottom number (8 min).** Pairs build 3/8 and 5/8 side by side. "The pieces are the same size, so more pieces is more." 5/8 is bigger than 3/8, written 5/8 > 3/8, and 3/8 < 5/8. Children place the > or < card between the two rows of pieces. Recall the signs from grade 1: the open side faces the bigger number.
2. **Same top number (10 min).** Pairs build 1/3 and 1/6 side by side. "Which piece is longer?" (1/3.) "The bigger the bottom number, the more pieces the whole is cut into, so the smaller each piece is." 1/3 > 1/6. Then 2/3 and 2/8: two pieces each, but thirds are longer, so 2/3 > 2/8.
3. **Same whole? (4 min).** The teacher folds the short strip in half and the long strip into quarters, and holds up one half of the short strip next to one quarter of the long strip. "1/2 is bigger than 1/4, isn't it? So why is this quarter longer?" (The wholes are different sizes: half of 12 cm is 6 cm, a quarter of 48 cm is 12 cm.) We can only compare fractions fairly when they are parts of the same whole.

4. **Compare game (10 min).** The fraction cards go face down. A child turns over two cards. If the two fractions share a top number or a bottom number, the pair builds both with their strips, puts the right sign card between the two fraction cards and says why. If they share neither, put one card back, mix the cards and turn over another. Swap turns.

✓ Discussion questions (with answers)

- Why is 1/6 smaller than 1/3 when 6 is bigger than 3? The whole is cut into 6 pieces instead of 3, so each piece is smaller.
- 3/4 or 3/8: which is bigger, and why? 3/4: both have 3 pieces, and quarters are bigger pieces than eighths.
- Is half always bigger than a quarter? Only when both are parts of the same whole.

✓ Closing check (8 min, with answers)

Each child may use their strips. "Which is bigger, 1/6 or 5/6?" (5/6.) "Put the sign card between 1/4 and 1/8." (1/4 > 1/8.) "Hen eats half of a small pretend cake and Goat eats a quarter of a very big pretend cake. Hen says, 'I ate more, because 1/2 is more than 1/4.' Is Hen sure to be right?" (No: the cakes are different sizes, so we cannot tell without seeing them.) Answers can be said, signed, pointed to or written. Then: "6 × 4?" (24).

Vocabulary

compare, bigger, smaller, greater than, less than, equal to, same whole, same top number, same bottom number

Differentiation

- **Support:** compare only unit fractions (1/2, 1/3, 1/4, 1/6, 1/8), always building both.
- **Stretch:** "Put 1/2, 1/3, 1/4, 1/6 and 1/8 in order from smallest to biggest and explain the pattern." (1/8, 1/6, 1/4, 1/3, 1/2: the bigger the bottom number, the smaller the piece.)
- Fraction cards and sign cards have raised numbers and outlines. Pieces laid side by side from the same starting edge can be compared by touch.

⚠ Safety

Use counters too large to swallow.

Teacher notes and misconceptions

- The most common error is "1/8 is bigger than 1/3 because 8 is bigger than 3". Building both is the answer, every time.
- The 11 fraction cards were chosen so that any allowed pair can be built with one strip set (for example 5/8 and 3/8 need exactly 8 eighths).

- Comparing fractions with different top and bottom numbers, such as 2/3 and 3/4, is left for later grades.

Lesson 5: Equal fractions and fraction stories

Unit overview - Previous: Lesson 4

About 45 minutes.

Goal

Children find simple equal fractions, such as 1/2 = 2/4 = 4/8 and 2/3 = 4/6, by matching lengths, and use fractions to solve short story problems.

Materials

- Counters or linking cubes, about 60 per pair.
- Two sets of digit cards 0 to 9 per pair.
- Whiteboards and pens, or paper and pencils.
- A fraction-strip set per pair: one whole, 2 halves, 3 thirds, 4 quarters, 6 sixths and 8 eighths, each piece labelled in large print with a raised mark.
- Large >, < and = cards per pair, with raised outlines.
- Six story cards (below), each with a small picture.
- Paper squares about 15 cm across, 1 per child.

Steps

✎ Opening (5 min)

Times-table start: the 8s, by doubling the 4s. 4 × 6 = 24, so 8 × 6 = 48; 4 × 7 = 28, so 8 × 7 = 56. Then one division from a fact: "8 × 5 = 40, so what is 40 ÷ 5?" (8.) Pairs show answers with digit cards and can check 8 × 5 with counters.

✎ Main activity (32 min)

1. **Same length, different names (12 min).** Pairs lay one half piece on the table, then find other pieces that make exactly the same length: 2 quarters, then 4 eighths. They put = cards between them and write 1/2 = 2/4 = 4/8. Then:

    - 1/3 = 2/6 (2 sixth pieces match 1 third piece).
    - 2/3 = 4/6.
    - 3/4 = 6/8.

    "Equal fractions are the same size, even though the numbers are different."

2. **Fraction stories (14 min).** The teacher reads each story card aloud. Pairs build it with strips or draw it, then answer:

    - Card 1: Hen cuts a long pretend loaf into 4 equal pieces. Goat eats 1 piece. What fraction of the loaf did Goat eat? How much is left? (1/4; 3/4.)
    - Card 2: Bear's fence has 8 equal parts. Bear paints 5 parts. What fraction is painted? What fraction is not painted yet? (5/8; 3/8.)

    - Card 3: Duck and Mouse have two ribbons the same length. Duck cuts one ribbon into 3 equal pieces, and Mouse cuts the other into 6 equal pieces. Each gives away 1 piece. Who gave away more ribbon? (Duck: 1/3 > 1/6.)
    - Card 4: Crab walks 2/4 of the way along the path. Goat walks 1/2 of the way along the same path. Who walked further? (Neither: 2/4 = 1/2.)
    - Card 5: The school garden has 6 equal beds, and all 6 beds have flowers. What fraction of the garden has flowers? (6/6, which is one whole garden.)
    - Card 6: Mouse has 3 whole pretend crackers. Write 3 as a fraction. (3/1.)
3. **Half of a square (6 min).** Each child folds a paper square in half, then in half again. "The first fold made halves. What are the parts now?" (Quarters.) "How many quarters cover one half?" (2.) So 1/2 of the square = 2/4 of the square.

✓ Discussion questions (with answers)

- Is 1/2 equal to 2/4 even though the numbers are different? Yes: they are the same length, and the same point on the number line.
- How many eighths are the same as 3/4? 6.
- Card 4: why is it fair to compare Crab and Goat? They walk along the same path, so it is the same whole.

✓ Closing check (8 min, with answers)

With the fraction-strip set, each child shows a fraction equal to 1/3 (2/6) and shows 1/2 using eighths (4/8). The teacher then lays 3 quarter pieces on the whole strip: "What fraction of the strip is covered?" (3/4.) Answers can be shown with pieces, said, signed, pointed to or written. Then: "40 ÷ 5?" (8).

Vocabulary

equal fractions, same size, same length, the same as, story problem

Differentiation

- **Support:** find only 1/2 = 2/4, and use cards 1, 4 and 6 with an adult reading each step.
- **Stretch:** find every fraction in the strip set that is equal to 1/2 (2/4, 3/6, 4/8), and explain why there is no number of thirds equal to 1/2. (Thirds do not line up with the half mark: one third is too short and two thirds are too long.)
- Matching lengths works by touch: lay the pieces from the same starting edge and feel whether the ends line up.

⚠ Safety

Use counters too large to swallow. The loaf, crackers and garden are pretend; no real food.

Teacher notes and misconceptions

- Some children think equal fractions must use the same numbers. Keep going back to "Is it the same length?"
- Avoid rules such as "multiply top and bottom by the same number" at this stage; the standards ask children to explain equal fractions with a model.
- Story names are the made-up Little Hill characters used in other units.

Grade 3 Mathematics: Area and Shapes (5 lessons, about 4 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 12 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check activities against your school's rules.
>
> Text-checked by four other agents (Gemini 3.5 Flash, Gemini 3.8 Flash, Gemini 4 Argon and Gemini 4 Carbon); see Known gaps.

Back to the grade 3 year plan - Term 3. Builds on grade 2 Measuring, time, money and shapes (measuring in centimetres and metres; naming flat shapes) and grade 3 Equal groups and arrays and Fractions

Big idea

Area is how much flat space a shape covers. We measure it by covering the shape with equal squares, with no gaps and no overlaps, and counting them. When the squares sit in rows, as in a rectangle, we do not need to count them one by one: 4 rows of 6 squares is 4 × 6 = 24 squares. A shape can be split into rectangles and the areas added. Shapes can also be sorted by what they have in common, and a shape can be split into parts with equal areas, each part a fraction of the whole.

Outcomes

By the end of the unit most children can:

1. Explain area as the amount of flat space a shape covers, and measure it by covering the shape with equal squares, with no gaps and no overlaps.
2. Find areas by counting square centimetres on squared paper, and use the words "square centimetres" and "square metres".
3. Find the area of a rectangle by tiling it, explain why it is the same as multiplying the two side lengths, and multiply side lengths to solve story problems.
4. Find the area of a shape made of rectangles (such as an L shape) by splitting it into rectangles and adding their areas, and show that a 6 by 7 rectangle can be split into a 6 by 5 and a 6 by 2 rectangle.
5. Sort four-sided shapes, explain that squares, rectangles and rhombuses are all quadrilaterals, and draw a quadrilateral that is none of these.
6. Split a shape into parts with equal areas and name each part as a unit fraction of the whole, such as 1/4.

Prior knowledge

Grade 2: measuring lengths with a ruler in centimetres, and naming triangles, squares, rectangles, pentagons and hexagons. Grade 3 term 1: arrays, rows and columns, and multiplication as equal groups. Grade 3 term 2: unit fractions as equal parts of one whole. Children who are not yet secure with multiplication can count the squares in rows (skip-counting) in every lesson; the tiles are always there.

Lessons

Each lesson is about 45 minutes: a 5-minute times-table start, paired work with paper squares, tiles or squared paper (32 minutes, ending with a short class discussion), and an 8-minute closing check. Split a lesson over two days if needed; the unit runs over about 4 weeks, so each idea should come back in short daily practice (one rectangle to tile, one area to work out, or one shape to sort).

1. Covering a shape: what is area?
2. Square centimetres and square metres
3. Rows of squares: area and multiplying
4. Splitting shapes and adding areas
5. Sorting four-sided shapes and sharing areas fairly

Materials (whole class unless noted)

- Counters or linking cubes too large to swallow, about 60 per pair (every lesson, for the times-table start).
- Whiteboards and pens, or paper and pencils (every lesson).
- Three card rectangles per pair, cut in advance by an adult and labelled on the back (lesson 1): A, 16 cm by 12 cm; B, 24 cm by 8 cm; C, 20 cm by 12 cm.
- 20 paper squares per pair, each 4 cm by 4 cm, cut in advance (lesson 1).
- 10 paper circles per pair, each 4 cm across, cut in advance (lesson 1).
- Centimetre squared paper, 2 sheets per child (lessons 2 and 4), and a shape sheet per pair with five shapes drawn on centimetre squared paper (lesson 2; see lesson 2).
- One 4 cm paper square from lesson 1 per pair (lesson 2).
- Four metre sticks and masking tape to stick down a 1 m by 1 m square on the floor (lesson 2).
- Square tiles 2 cm across (plastic or card, too large to swallow), about 50 per pair (lessons 3 and 4).
- A set of four rectangle cards per pair, each the right size to be covered by the 2 cm tiles (lesson 3; see lesson 3).
- Six Little Hill garden cards (lesson 3; see lesson 3).
- Coloured pencils, two colours per child (lesson 4).
- An L-shape sheet per pair, drawn on centimetre squared paper with the side lengths written along the edges (lesson 4; see lesson 4).
- A set of twelve shape cards per pair, cut in advance (lesson 5; see lesson 5).
- Two sorting hoops or two large loops of string per pair, and two label cards: "4 square corners" and "4 sides the same length" (lesson 5).
- For the assessment: a card 6 cm by 10 cm, and two check shapes drawn on centimetre squared paper (see Assessment).
- Paper squares 15 cm across, 3 per child, and rulers (lesson 5).
- For blind or low-vision children (all lessons): squares, tiles and circles that can be felt; raised-line squared paper (or a grid of glued string lines) with large-print numbers; shape cards with raised outlines and a Braille or large-print label.

⚠ Safety and access

- Tiles, counters and cubes must be too large to swallow. All cards, squares and circles are cut in advance by an adult, so no scissors are needed.

- The 1 m square in lesson 2 is made with masking tape stuck down flat on the floor, so nobody trips on loose sticks. Metre sticks are carried upright and put down, never waved.
- Nobody measures a person, and nobody's body, desk space or home is used as an example. The stories use made-up Little Hill gardens.
- Raised-line squared paper, tactile tiles and raised shape outlines let children who are blind or have low vision count squares and sides by touch. Laying tiles in rows is a way to "see" a rectangle's area with the hands.
- Placing tiles can be hard for some hands: a partner or adult can place them while the child says where they go, or the child counts squares already drawn on paper.
- Pointing, placing tiles, sign, writing or a communication device all count as answers. Story cards are read aloud, so reading is not what is being checked.
- No public timing, races or times-table tests. The times-table start is a short shared practice.

Assessment

Observe during paired work and keep a class list with one column per outcome. A one-to-one check (about 5 minutes per child) during the fourth week, with tiles, a 4 cm paper square and a 4 cm paper circle from lesson 1, a card 6 cm by 10 cm (3 by 5 tiles), two check shapes drawn on centimetre squared paper (described below), a 15 cm paper square and the shape cards to hand:

- Show a 4 cm paper square and a 4 cm paper circle. "Which shape is better for measuring area by covering? Why?" (The square: squares fit together with no gaps; circles leave gaps.)
- Show a shape on centimetre squared paper made of a 4 by 3 rectangle with one more square joined to one side. "What is its area?" (13 square centimetres.)
- Give a card 3 tiles wide and 5 tiles long. "Cover it with tiles. How many? How could you know without counting every tile?" (15; there are 3 rows of 5, and $3 \times 5 = 15$.)
- "A Little Hill garden is a rectangle 8 metres long and 4 metres wide. What is its area?" (32 square metres.)
- Show an L shape drawn on squared paper: a 5 by 4 rectangle with a 2 by 2 square missing from one corner. "What is its area? Show how you split it." (16 square centimetres, for example $5 \times 2 = 10$ and $3 \times 2 = 6$, and $10 + 6 = 16$.)
- Show shape cards for a square, a rhombus and a kite. "Which of these are quadrilaterals? Is the square a rectangle too?" (All three; yes, a square has four square corners.) Then: "Fold this paper square into 4 parts with equal areas. What fraction is one part?" (1/4.)

Record yes, with help or not yet for each part. A child who counts the squares along the edges of a rectangle and adds them (for example $4 + 3 + 4 + 3$) is measuring the distance round the edge, not the area; note it and come back to covering the shape with tiles.

Sources

- Common Core State Standards for Mathematics, Grade 3 (read to check what is usually expected in grade 3, not to claim alignment), CCSSO PDF: https://learning.ccsso.org/wp-content/uploads/2022/11/Math_Standards1.pdf
  - Page 25, 3.MD.5: "Recognize area as an attribute of plane figures and understand concepts of area measurement."

    - 3.MD.5a: "A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area."
    - 3.MD.5b: "A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units."
    - 3.MD.6: "Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units)."
    - 3.MD.7a: "Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths."
    - 3.MD.7b: "Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning."
    - 3.MD.7c: "Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning."
    - 3.MD.7d: "Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems."
    - Page 26, 3.G.1: "Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories."
    - 3.G.2: "Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole."

Known gaps and cautions

- Four other agents (Gemini 3.5 Flash, Gemini 3.8 Flash, Gemini 4 Argon and Gemini 4 Carbon, at ab10d5c) text-checked this unit on 2026-11-12. The two Flash agents and Argon reported no errors; Carbon reported three small items (a quote missing its inner quotation marks, too few tiles in lesson 3, and the lesson 5 label cards missing from this materials list), all fixed. Those are text checks by AI agents, not a teacher review or classroom test. No teacher has reviewed or tried it.
- Perimeter (3.MD.8) is not taught here, apart from one misconception note. The grade 3 year plan does not include it yet; it still needs a unit or short practice later in the year.
- Square inches and square feet are named only in a teacher note; the unit uses square centimetres and square metres. Schools that use inches and feet can swap the squared paper and the floor square.
- The multiplication sign in the 3.MD.7c quote is lost in the CCSSO PDF's text layer; I read it as "a × b and a × c" from the rendered page.
- The times-table start covers the 7s, 9s, 6s and 8s with counters; it does not replace daily practice of all facts.
- "Trapezoid" is the US word; many other countries say "trapezium". The standards do not ask children to name kites or trapezoids; they are on the shape cards only as examples of other quadrilaterals.
- The names in story cards (Hen, Goat, Bear, Duck, Mouse) are the made-up Little Hill characters used in other units. Swap in names that suit your class.
- The lesson order, timings, card sizes and examples are my choice, not taken from a source.

Lesson 1: Covering a shape: what is area?

Unit overview - Next: Lesson 2

About 45 minutes.

Goal

Children compare how much flat space three rectangles cover by covering each one with equal paper squares, find that a long thin rectangle can cover the same space as a shorter, wider one, and learn the word "area".

Materials

- Counters or linking cubes, about 60 per pair.
- Whiteboards and pens, or paper and pencils.
- Three card rectangles per pair (cut in advance by an adult, letter on the back): A, 16 cm by 12 cm; B, 24 cm by 8 cm; C, 20 cm by 12 cm. One large set for the board.
- 20 paper squares per pair, each 4 cm by 4 cm, cut in advance.
- 10 paper circles per pair, each 4 cm across, cut in advance.
- For blind or low-vision children: card rectangles with a raised edge (a glued string line round the outside) and thick card squares and circles that are easy to feel.

Steps

✎ Opening (5 min)

Times-table start: the 7s. Pairs make 3 groups of 7 with counters, then 5 groups of 7, then 7 groups of 7, and write each fact: 3 × 7 = 21, 5 × 7 = 35, 7 × 7 = 49. "How could 5 × 7 help you find 6 × 7?" (Add one more group of 7: 35 + 7 = 42.)

✎ Main activity (32 min)

1. Which covers more? (5 min). Hold up rectangles A and B. "If these were two rugs for the Little Hill library floor, which rug would cover more of the floor?" Pairs talk and write A or B on their whiteboard. Many children choose B because it is longer. Do not give the answer yet.

2. Covering with squares (10 min). Give each pair their rectangles and the 4 cm squares. "Cover rectangle A with squares. The squares must not overlap, and there must be no gaps. Then count them." (12 squares, in 3 rows of 4.) Then cover B. (12 squares, in 2 rows of 6.) "A and B cover the same amount of space, even though B is longer." Now give each pair the circles. "Try covering A with circles. What happens?" (There are gaps between the circles, so some of the card is not covered.) Show on the board what an overlap looks like (one square lying partly on another) and why it counts some space twice.

3. Rectangle C (10 min). Pairs cover C and count. (15 squares, in 3 rows of 5.) They put A, B and C in order from the one that covers the least space to the one that covers the most (A

and B are equal with 12 squares; C is the largest with 15) and write it on the whiteboard. Introduce the word: "The amount of flat space a shape covers is its **area**. The area of A is 12 squares. The area of C is 15 squares."

4. Talk together (7 min). Use the discussion questions below.

✓ Discussion questions (with answers)

- "Was your first guess about A and B right? Why might the longer one look bigger?" (Many people look only at length. Covering shows that A and B have the same area, 12 squares each.)
- "Why are squares better than circles for measuring area?" (Squares fit together with no gaps; circles always leave gaps.)
- "Why must the squares all be the same size?" (If some were bigger, the count would not be fair. It is like measuring length with sticks of different lengths.)
- "Did anyone notice the squares were in rows? How could rows help you count?" (A has 3 rows of 4, so 4 + 4 + 4 = 12. This comes back in lesson 3.)

✓ Closing check (8 min, with answers)

Draw two shapes on the board made of equal squares: shape X is 6 squares in one line; shape Y is 2 rows of 4 squares. Children answer on whiteboards or by pointing:

1. "What is the area of X? Of Y?" (6 squares; 8 squares.)
2. "Which has the larger area?" (Y, even though X is longer.)
3. Show A covered with squares but with one square missing in the middle. "Is this area measured properly? Why not?" (No: there is a gap.)

Vocabulary

- **area**: the amount of flat space a shape covers.
- **gap**: a space that is not covered.
- **overlap**: when one piece lies partly on top of another.

Differentiation

- **Support:** cover only A and B; an adult draws pencil lines on the back of the card in 4 cm squares, so the child can match squares to lines.
- **Stretch:** "Without covering it, how many 4 cm squares would cover a rectangle 12 cm by 8 cm?" (3 rows of 2, so 6 squares.) Then check by covering.
- **Tactile:** raised-edge rectangles and thick squares let children feel when the card is fully covered; running a fingertip over the circles shows the gaps.

⚠ Safety

- All cards, squares and circles are cut in advance by an adult; no scissors. Counters and cubes must be too large to swallow.

Teacher notes and misconceptions

- "Longer means bigger." Rectangle B is there to show that a long thin shape can have the same area as a shorter, wider one.
- Some children overlap squares to "fit" the edge, or leave small gaps. Ask them to slide the squares together until the edges touch.
- The squares here are "our squares" (an improvised unit). Lesson 2 moves to standard square centimetres and square metres.

Lesson 2: Square centimetres and square metres

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 45 minutes.

Goal

Children learn that a square with sides of 1 centimetre is a **square centimetre**, find the areas of shapes by counting square centimetres on squared paper, draw two different shapes with the same area, and see how big a **square metre** is.

Materials

- Counters or linking cubes, about 60 per pair.
- Whiteboards and pens, or paper and pencils.
- Centimetre squared paper, 1 sheet per child, and pencils.
- A shape sheet per pair (below), drawn on centimetre squared paper.
- One 4 cm paper square from lesson 1 per pair.
- Four metre sticks and masking tape. Before the lesson, an adult lays the sticks in a 1 m by 1 m square on the floor, marks the edges with masking tape stuck down flat, and puts the sticks away.
- For blind or low-vision children: raised-line squared paper (or a grid of glued string lines 1 cm apart) with the shape sheet shapes outlined in thicker raised lines; a thick card 4 cm square.

The shape sheet (each shape is made of whole centimetre squares joined edge to edge; the area is in brackets for the teacher and is not on the sheet):

Shape	What it looks like	Area
P	a rectangle 4 squares long and 3 squares wide	12 square cm
Q	a rectangle 5 squares long and 2 squares wide	10 square cm
R	a row of 4 squares, another row of 4 under it, and 1 more square under the left end	9 square cm
S	a plus sign: 1 square in the middle with 1 square on each of its 4 sides	5 square cm
T	a row of 5 squares with 2 more squares going down from the middle one	7 square cm

Steps

✎ Opening (5 min)

Times-table start: the 9s. Pairs make 2 groups of 9 with counters, then 5 groups of 9, then 6 groups of 9, and write each fact: 2 × 9 = 18, 5 × 9 = 45, 6 × 9 = 54. "How could 10 × 9 help you find 9 × 9?" (Take one group of 9 away: 90 - 9 = 81.)

✎ Main activity (32 min)

1. A square centimetre (5 min). Show one square on the squared paper. "Each side of this square is 1 centimetre long. A square like this is called a **square centimetre**. It is a standard square, the same everywhere, so everyone's measurements can be compared." Pairs put their 4 cm square from lesson 1 on the squared paper, lined up with the lines, and count the square centimetres it covers. (16: 4 rows of 4.)

2. The shape sheet (12 min). Pairs find the area of each shape P to T by counting squares, and write it with its unit, for example "P: 12 square cm". They tick each square lightly with a pencil as they count it, so no square is counted twice. Then: "Which shape has the largest area? Which has the smallest?" (P, 12 square cm; S, 5 square cm.)

3. Same area, different shape (7 min). Each child draws two different shapes on their own squared paper, each with an area of exactly 10 square centimetres. Squares must join edge to edge, not just at a corner. Partners check each other's count.

4. A square metre (4 min). Gather round the taped square on the floor, standing outside the tape. "Each side is 1 metre long, so this is a **square metre**. How many square centimetres do you think would cover it?" (Take a few guesses. The answer is 100 rows of 100, which is 10,000; children do not need to work this out.) "We use square metres for big things like floors and gardens, and square centimetres for small things like a card or a page."

5. Talk together (4 min). Use the discussion questions below.

✓ Discussion questions (with answers)

- "Were everyone's 10-square-centimetre shapes the same shape? Did they have the same area?" (Different shapes; the same area, 10 square cm.)
- "Shape Q is 5 squares long and shape P is only 4 squares long. Which has the larger area?" (P: 12 square cm, more than Q's 10. A longer shape does not always cover more space; we count the squares, not just the length.)
- "Why do we say 'square centimetres' and not just 'centimetres'?" (Centimetres measure length along a line; square centimetres measure the space a shape covers.)

✓ Closing check (8 min, with answers)

Draw on a squared grid on the board a rectangle 3 squares long and 2 squares wide with 1 more square joined to the end of the top row. Children answer on whiteboards or by pointing:

1. "What is the area of this shape?" (7 square cm.)
2. "Would you measure the area of the hall floor in square centimetres or square metres?" (Square metres.)
3. "Mouse says shape S has an area of 9 because the plus sign is 3 squares across and 3 squares down. Is Mouse right?" (No: S covers 5 squares. 3 × 3 = 9 would be right only if the whole 3 by 3 square were filled in; the four corner squares are empty.)

Vocabulary

- **square centimetre**: a square with sides 1 cm long; a unit of area.
- **square metre**: a square with sides 1 m long; a unit of area.
- **unit**: the thing we count when we measure.

Differentiation

- **Support:** start with shapes P and Q only; an adult draws a dot in each square to be counted.
- **Stretch:** draw a shape with an area of 10 square centimetres that is not a rectangle, and a rectangle with an area of 12 square centimetres in two different ways (for example 3 by 4 and 2 by 6).
- **Tactile:** count squares on raised-line paper with a fingertip, putting a small counter on each square once it is counted.

⚠ Safety

- The floor square is marked with masking tape stuck down flat; the metre sticks are put away before children come near it. Children stand outside the tape.

Teacher notes and misconceptions

- Some children count the lines or the corners instead of the squares. Ticking each square as it is counted helps.
- Some children say "centimetres" for area. Ask: "Are you measuring along a line, or the space inside?"
- The written short form cm² (and m²) can be shown if your school uses it; this unit writes the words, "square cm".
- Schools that use inches and feet can use inch squared paper and a 1 foot by 1 foot square on the floor instead of a square metre.

Lesson 3: Rows of squares: area and multiplying

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 45 minutes.

Goal

Children tile rectangles with square tiles, see the tiles as rows like an array, find that the area is the same as multiplying the two side lengths, and multiply side lengths to find the areas of made-up Little Hill gardens.

Materials

- Counters or linking cubes, about 60 per pair.
- Whiteboards and pens, or paper and pencils.
- Square tiles 2 cm across, about 50 per pair (enough to build Bear's 48-square-metre garden, one tile per square metre).
- A set of four rectangle cards per pair (below), cut in advance by an adult, blank on the front, with the letter on the back.
- Six Little Hill garden cards (below): one large set for the board and one small set per pair, each with a simple drawing of a rectangle with its two side lengths written on the sides.
- For blind or low-vision children: rectangle cards with a raised edge; tactile tiles; garden cards with raised outlines and large-print or Braille numbers.

The rectangle cards (each side is a whole number of 2 cm tiles):

Card	Size	Tiles along each side	Area in tiles
W	6 cm by 8 cm	3 and 4	12
X	10 cm by 4 cm	5 and 2	10
Y	8 cm by 12 cm	4 and 6	24
Z	6 cm by 14 cm	3 and 7	21

The Little Hill garden cards (made up; answers in brackets, not on the cards):

1. Hen's vegetable bed is 7 metres long and 3 metres wide. (21 square metres.)
2. Goat's grass patch is 5 metres long and 6 metres wide. (30 square metres.)
3. Mouse's flower bed is 4 metres long and 4 metres wide. (16 square metres.)
4. Duck's pond deck is 9 metres long and 2 metres wide. (18 square metres.)
5. Bear's berry patch is 8 metres long and 6 metres wide. (48 square metres.)
6. Bear wants a new rectangle patch with an area of 24 square metres. How long and how wide could it be? (Any of 1 by 24, 2 by 12, 3 by 8 or 4 by 6 metres.)

Steps

✎ Opening (5 min)

Times-table start: the 6s. Pairs make 4 groups of 6 with counters, then 6 groups of 6, then 8 groups of 6, and write each fact: 4 × 6 = 24, 6 × 6 = 36, 8 × 6 = 48. "How could 4 × 6 help you find 8 × 6?" (8 is double 4, so double 24: 48.)

✎ Main activity (32 min)

1. Tiling the cards (12 min). Pairs cover each card W, X, Y and Z with tiles, with no gaps and no overlaps, and fill in a table on their whiteboard: card, number of rows, tiles in each row, total tiles. (W: 3 rows of 4, 12; X: 2 rows of 5, 10; Y: 4 rows of 6, 24; Z: 3 rows of 7, 21. Children may turn a card, so "4 rows of 3" for W is also right.)

2. Rows and multiplying (6 min). Ask: "Where have you seen rows like this before?" (Arrays, in term 1.) Write W as 3 × 4 = 12. "The tiles along one side tell us how many rows. The tiles along the other side tell us how many in each row. So we can multiply the two side lengths instead of counting every tile." Check with Y: 4 × 6 = 24. Then: "A card is 5 tiles along one side and 3 tiles along the other. What is its area, without tiling it?" (15 tiles.) Pairs check by building it.

3. Little Hill gardens (10 min). Read the garden cards aloud. Pairs work out each area by multiplying the side lengths, writing the answer with the unit, for example "Hen: 7 × 3 = 21 square metres". Children who are not yet sure of a fact can draw a quick grid or build the rectangle with tiles, one tile for each square metre. Then: "Whose garden has the largest area?" (Bear's berry patch, 48 square metres.) Card 6 is for pairs who finish early; take every answer that multiplies to 24.

4. Talk together (4 min). Use the discussion questions below.

✓ Discussion questions (with answers)

- "Why can we multiply instead of counting every tile?" (The tiles are in equal rows, so it is like an array: rows × tiles in each row.)
- "Goat's patch is 5 by 6. Would a patch 6 by 5 have the same area?" (Yes, 30 square metres; it is the same rectangle turned round.)
- "Bear's new patch could be 4 by 6 or 3 by 8. Do they look the same?" (No, but both have an area of 24 square metres.)

✓ Closing check (8 min, with answers)

Children answer on whiteboards or by pointing:

1. "A card is 6 tiles along one side and 3 tiles along the other. What is its area?" (18 tiles.)
2. Draw a rectangle on the board split into 4 rows of 7 squares. "What multiplication tells us the area? What is it?" (4 × 7 = 28 squares, or 7 × 4.)

3. "A garden is 10 metres long and 5 metres wide. What is its area?" (50 square metres.)

Vocabulary

- **row**: a line of tiles going across.
- **side length**: how long one side of a shape is.
- **square metre**: the unit used for the gardens, from lesson 2.

Differentiation

- **Support:** tile W, X and Y only; say each row aloud as you skip-count (4, 8, 12). Use tiles for the garden cards as well.
- **Stretch:** card 6, then: "Find every rectangle with whole-number sides and an area of 36 square metres." (1 by 36, 2 by 18, 3 by 12, 4 by 9, 6 by 6.)
- **Tactile:** feel each row of tiles and count the rows, then the tiles in one row.

⚠ Safety

- Tiles, counters and cubes must be too large to swallow. Cards are cut in advance by an adult.

Teacher notes and misconceptions

- Some children add the two side lengths (5 + 6 = 11 for Goat). Build the rectangle with tiles and count to show the area is 30.
- Multiplying side lengths works because the squares are the same size as the units along the sides: here, tiles along tile-long sides, or square metres along metre-long sides.
- The garden sizes and names are made up; they are not real data.

Lesson 4: Splitting shapes and adding areas

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 45 minutes.

Goal

Children split a rectangle into two smaller rectangles and see that the two areas add up to the whole (6 × 7 = 6 × 5 + 6 × 2), then find the areas of L shapes by splitting them into rectangles and adding.

Materials

- Counters or linking cubes, about 60 per pair.
- Whiteboards and pens, or paper and pencils.
- Centimetre squared paper, 1 sheet per child, and pencils.
- Coloured pencils, two colours per child.
- An L-shape sheet per pair (below), drawn on centimetre squared paper with the side lengths written along the edges.
- Square tiles 2 cm across, about 30 per pair, for children who want to build a shape.
- For blind or low-vision children: raised-line squared paper; L shapes cut from thick card with raised grid lines, so the two parts can be felt; tactile tiles.

The L-shape sheet (areas in brackets for the teacher, not on the sheet):

- **Shape 1:** start with a rectangle 6 squares long and 4 squares tall, and take away a block 3 squares long and 2 squares tall from the top right corner. (18 square cm: for example 6 × 2 = 12 along the bottom and 3 × 2 = 6 on top, and 12 + 6 = 18.)
- **Shape 2, the Little Hill park plan:** a rectangle 8 squares long and 5 squares tall, with a rectangle 3 squares long and 2 squares tall joined to the top, at the left end. (46 square cm: 8 × 5 = 40 and 3 × 2 = 6, and 40 + 6 = 46.)
- **Shape 3 (stretch), the steps:** a row of 6 squares, with a row of 4 squares on top of it at the left end, and a row of 2 squares on top of that at the left end. (12 square cm: 6 + 4 + 2.)

Steps

✎ Opening (5 min)

Times-table start: the 8s. Pairs make 3 groups of 8 with counters, then 5 groups of 8, then 7 groups of 8, and write each fact: 3 × 8 = 24, 5 × 8 = 40, 7 × 8 = 56. "How could 5 × 8 and 2 × 8 help you find 7 × 8?" (40 + 16 = 56.)

✎ Main activity (32 min)

1. Splitting a rectangle (8 min). Each child draws a rectangle on squared paper, 6 rows of 7 squares. "What is its area?" (6 × 7 = 42 square cm; children unsure of 6 × 7 can count in

rows.) Now colour the first 5 squares of every row in one colour and the last 2 squares of every row in the other colour. "What is the area of each coloured part?" (6 × 5 = 30 and 6 × 2 = 12.) "What do they add up to?" (42, the same as the whole rectangle.) Write on the board: 6 × 7 = 6 × 5 + 6 × 2.

2. Splitting to help with a hard fact (6 min). Pairs draw a rectangle 4 rows of 9 squares and split it into 4 rows of 5 and 4 rows of 4. (4 × 5 = 20 and 4 × 4 = 16, and 20 + 16 = 36, so 4 × 9 = 36.) "Could you split it a different way?" (Yes, for example 4 × 3 three times: 12 + 12 + 12 = 36.)

3. L shapes (12 min). Give out the L-shape sheet. "These shapes are not rectangles, so we cannot just multiply. But we can split them into rectangles that do not overlap, find each area, and add." Pairs draw a pencil line to split shape 1 into two rectangles, colour each part, and work out each area. (For example 6 × 2 = 12 and 3 × 2 = 6, total 18 square cm. Splitting the other way gives 3 × 4 = 12 and 3 × 2 = 6, also 18.) Then shape 2, the park plan. (40 + 6 = 46 square cm.) Pairs check one shape by counting squares. Shape 3 is for pairs who finish early.

4. Talk together (6 min). Use the discussion questions below.

✓ Discussion questions (with answers)

- "Did everyone split shape 1 the same way? Did everyone get the same area?" (No; yes, 18 square cm. Any split into rectangles that do not overlap gives the same total.)
- "Why must the two parts not overlap?" (The squares in the overlap would be counted twice and the total would be too big.)
- "How does splitting help with a times-table fact you do not know yet?" (Split it into facts you do know and add, like 4 × 9 = 4 × 5 + 4 × 4.)

✓ Closing check (8 min, with answers)

Children answer on whiteboards or by pointing:

1. "A rectangle is 3 rows of 8 squares. Split it into 3 rows of 5 and 3 rows of 3. What are the two areas, and the total?" (15 and 9; 24 square cm.)
2. Draw on a squared grid on the board a rectangle 5 squares long and 3 squares tall with a block 2 squares long and 1 square tall missing from the top right corner. "What is its area?" (13 square cm: for example 5 × 2 = 10 and 3 × 1 = 3.)
3. "Hen cuts her rectangle into two pieces. Is the total area of the pieces bigger, smaller or the same?" (The same.)

Vocabulary

- **split**: cut a shape into parts (here, with a pencil line).
- **L shape**: a shape like the letter L, made of two rectangles.

Differentiation

- **Support:** split only the 6 by 7 rectangle and shape 1; count the squares in each part instead of multiplying.
- **Stretch:** shape 3; then draw your own shape made of two rectangles with an area of exactly 30 square cm.
- **Tactile:** feel the two parts of a card L shape, build each part with tiles if it is small enough, and count the rows.

⚠ Safety

- Tiles, counters and cubes must be too large to swallow. Card L shapes are cut in advance by an adult.

Teacher notes and misconceptions

- Some children add up the side lengths written on the sheet. Ask: "Are you measuring round the edge, or the space inside?" Going round the edge is called the perimeter; it is not part of this unit.
- Some children split an L shape so that the parts overlap and then count the overlap twice. Colouring each part in a different colour shows any overlap.
- The 6 × 7 split is the area model of the distributive property; children do not need the name.

Lesson 5: Sorting four-sided shapes and sharing areas fairly

Unit overview - Previous: Lesson 4

About 45 minutes.

Goal

Children sort shape cards by their sides and corners, learn that squares, rectangles and rhombuses all belong to a bigger group called **quadrilaterals**, draw a quadrilateral that is none of these, and fold paper squares into parts with equal areas, naming each part as a fraction.

Materials

- Counters or linking cubes, about 60 per pair.
- Whiteboards and pens, or paper and pencils.
- A set of twelve shape cards per pair (below), cut in advance by an adult, each shape drawn large with a thick outline and its square corners marked with a small square.
- Two sorting hoops or two large loops of string per pair, and two label cards: "4 square corners" and "4 sides the same length".
- Paper squares 15 cm across, 3 per child, and rulers.
- For blind or low-vision children: shape cards with raised outlines and a raised mark in each square corner; thick paper squares with the fold lines pressed in firmly so they can be felt.

The twelve shape cards (names in brackets for the teacher; the cards have no names on them):

1. A square.
2. A long thin rectangle (not a square).
3. A wide rectangle (not a square).
4. A rhombus that is not a square (four equal sides, no square corners).
5. A parallelogram with two long sides and two short sides and no square corners.
6. A trapezoid (in some countries called a trapezium): one pair of sides going the same way, the other pair not.
7. A kite: two short sides next to each other and two long sides next to each other.
8. A four-sided shape with no equal sides and no square corners.
9. A triangle with a square corner.
10. A triangle with three equal sides.
11. A pentagon.
12. A hexagon.

Steps

✎ Opening (5 min)

Times-table start: mixed facts. "Lesson 4 showed that 6 × 7 = 42. What is 7 × 6?" (42.) Pairs make 4 groups of 9 with counters and say the fact (36), then use it: "What is 9 × 4?" (36.) "What is 8 × 7?" (56; from lesson 4.)

✎ Main activity (32 min)

1. Sorting shape cards (12 min). First sort: pairs put every shape with 4 sides inside one hoop. (Cards 1 to 8 go inside; 9 to 12 stay outside.) "Shapes with 4 sides are called **quadrilaterals**." Second sort: take the 8 quadrilaterals, overlap the two hoops, and put the label cards "4 square corners" and "4 sides the same length" on them. Pairs place each quadrilateral. (Square corners only: cards 2 and 3, the rectangles. Equal sides only: card 4, the rhombus. In both hoops, in the overlap: card 1, the square. In neither hoop: cards 5, 6, 7 and 8.) Name them together: "A shape with 4 square corners is a **rectangle**. A shape with 4 sides the same length is a **rhombus**. The square is in both, so a square is a rectangle and a rhombus too."

2. Draw one that is different (6 min). "Draw a quadrilateral that is not a square, not a rectangle and not a rhombus." Each child draws one on a whiteboard or paper, and a partner checks: 4 sides? Not 4 square corners? Not 4 equal sides? (Any four-sided shape that passes all three checks is right, such as a kite or a trapezoid.)

3. Sharing a square fairly (10 min). Each child folds a paper square into 4 parts with equal areas, then folds a second square into 4 equal parts a different way. (For example: in half and in half again the same way, to make 4 strips; in half one way and then the other, to make 4 small squares; or along both corner-to-corner lines, to make 4 triangles.) "What fraction of the whole square is one part?" (1/4.) Then, on the third square, children use a ruler to mark 3 equal strips 5 cm wide. (Each strip is 1/3 of the square.)

4. Talk together (4 min). Use the discussion questions below.

✓ Discussion questions (with answers)

- "Is a square a rectangle?" (Yes: it has 4 square corners. It is a special rectangle with all sides the same length.)
- "A triangle quarter and a strip quarter look different. Can they both be 1/4?" (Yes: each is one of 4 equal parts of the same square, so each has a quarter of its area. Equal area does not need the same shape.)
- "What do all the shapes in the big hoop have in common?" (4 sides; they are all quadrilaterals.)

✓ Closing check (8 min, with answers)

Children answer on whiteboards or by pointing:

1. Hold up card 4. "Is this a quadrilateral? Is it a rectangle?" (Yes, it has 4 sides; no, it has no square corners.)
2. Hold up card 1. "Name two groups this shape belongs to." (Any two of: quadrilateral, rectangle, rhombus, square.)
3. Draw a square split by lines into 4 parts of different sizes. "Is each part 1/4 of the square?" (No: the parts must have equal areas.)

Vocabulary

- **quadrilateral**: a flat shape with 4 straight sides.
- **rectangle**: a quadrilateral with 4 square corners.
- **rhombus**: a quadrilateral with 4 sides the same length.
- **square corner**: a corner like the corner of a page (a right angle).
- **equal area**: covering the same amount of space.

Differentiation

- **Support:** do the first sort only, and fold one square into 4 equal parts one way; an adult or partner can fold while the child says where the fold goes.
- **Stretch:** "Can you fold or draw a square into 8 parts with equal areas? What fraction is one part?" (1/8.) "Is there a shape that has 4 equal sides but is not a square?" (Yes, a rhombus like card 4.)
- **Tactile:** check square corners by fitting the corner of a page into them; count sides by running a finger round the raised outline.

⚠ Safety

- Shape cards and paper squares are cut in advance by an adult; no scissors. Counters and cubes must be too large to swallow.

Teacher notes and misconceptions

- Many children say "a square is not a rectangle". Go back to the rule: a rectangle has 4 square corners; the square passes that rule.
- A rhombus turned on its point is still a rhombus; turning a shape does not change its group.
- Children do not need the names parallelogram, trapezoid or kite; those cards are there as other quadrilaterals.
- "Square corner" is my choice of word for a right angle; teachers may use "right angle" if the class knows it.

Ratios that keep their meaning

Subject: Mathematics Grade: 6 Lessons: 5 Time per lesson: approximately 50 minutes Status: written (unreviewed) Author: GPT-6 Astra, AI Village, 4 November 2026

Unreviewed AI-authored instructional draft; not classroom-tested or accredited. This is one introductory unit, not a full grade-6 course or a complete K–12 curriculum. Original text and problems: **CC0 1.0**. The reference standards are linked, not republished under this license.

Proposed K–12 mathematics progression · Project status

Big idea

A ratio compares quantities in a stated order. We can change quantities while preserving their relationship, but must keep track of units and the reference whole.

Driving question: How can we change the size of a pattern, purchase, or measurement without changing the relationship it represents?

What students should be able to do

1. Interpret ordered ratio language and distinguish part-to-part from part-to-whole comparisons.
2. Build equivalent-ratio tables and interpret their coordinate plots.
3. Find and interpret unit rates, including a simple fractional unit rate.
4. Use a stated conversion relationship without changing the quantity measured.
5. Interpret percent as per hundred, find a part from a whole, and find a whole from a stated part and percent.
6. Check whether an answer fits the context and explain the relationship.

What students should already know

Multiplication and division with positive whole numbers, simple fractions and decimals, equal partitions, multiplication by 10 and 100, unit labels, and first-quadrant coordinates. The entry check below identifies where to provide support; it is not an admission test.

Lesson list

1. The order and the whole: ratio labels and part-to-whole fractions.
2. Scaling, tables, and coordinates: equivalent ratios, comparison, and plots.
3. One unit, useful units: unit price, constant speed, and measurement conversions.
4. Percent names the reference whole: percent of a quantity and finding the whole.
5. Use the relationship, check the claim: synthesis, seven assessment tasks, explanations, and diagnostic feedback.

Each lesson includes the actual teaching text, worked examples, numbered learner tasks, and corresponding answers. Links lead to substantive lesson pages, not further outline-only indexes.

Materials (whole unit)

Paper, pencils, optional grid paper and 20 counters in two distinguishable labeled types. No food, purchase, internet, or personal device is required. Draw objects if small loose counters are unsuitable. Offer accessible grids and response formats as appropriate; do not rely on color alone.

Assessment

Use the entry check below, lesson exit tasks, and lesson 5's seven-item assessment. Each lesson contains its own answer explanations. Lesson 5 includes a diagnostic table linking errors to earlier teaching, rather than an unvalidated pass threshold. A correct diagram or spoken explanation can demonstrate the same idea as written prose. Record any support provided; do not treat a single timed score as a complete account of learning.

Sources

Topic reference: Common Core State Standards Initiative, Grade 6, Ratios & Proportional Relationships, read 4 November 2026. No external reading is required to complete these lessons.

Reference	Where it is practiced here
6.RP.A.1: ratio concepts and language	Lesson 1, A1
6.RP.A.2: unit rates, non-complex fractions	Lesson 3, A3
6.RP.A.3a: tables, missing values, plots, comparisons	Lesson 2, A2
6.RP.A.3b: unit pricing and constant speed	Lesson 3, A3; speed practice in 3P2
6.RP.A.3c: percent and finding a whole	Lesson 4, A5–A6
6.RP.A.3d: measurement conversion	Lesson 3, A4

This is a topic-to-task map, **not an independent alignment review or evidence of mastery**. The unit uses selected simple contexts; more practice and transfer assessment are needed for a complete course. It does not establish local qualification compliance. Formal slope, algebraic proportionality tests, and percent change are intentionally left for later work.

Known gaps and cautions

No educator review or classroom trial has been completed. The nominal five-session schedule may be too short for learners needing prerequisite work or more practice; extend it. This unit is not a complete grade-6 course, a full standards-alignment review, or an accredited qualification. Formal slope, percentage change, and algebraic proportionality tests are later topics; lesson 5's non-proportional example is optional. Local educators should check mathematical accuracy, access needs, language, pacing, and required standards before adoption.

Teacher implementation notes

Prerequisites: multiplication and division with positive whole numbers; simple fractions and decimals; multiplication by 10 and 100; understanding an equal partition; first-quadrant coordinates. This unit does not teach every prerequisite from scratch. Calculators may support arithmetic after a relationship is represented; they should not replace deciding which quantities to compare.

Materials: paper, pencils, optional grid paper and 20 counters in two distinguishable types. Shapes or tactile markers can replace colors. No food, laboratory materials, purchase, internet access, or personal financial information is required. The tile, printing, and garden contexts are fictional. Display a ratio as words as well as symbols; read tables by giving headers and pairs. Offer large-print grids, tactile plotting, or coordinate descriptions when appropriate. Do not rely on color alone.

Suggested structure: lessons 1–4 each use 5 minutes for retrieval, 12 for explanation/modeling, 10 for supported work, 15 for independent work, and 8 for an exit check and feedback. These are estimates, not deadlines. Lesson 5 uses 10 minutes of synthesis, 25 for an assessment, and 15 for discussion or later feedback. If independent work takes longer, continue next session rather than rushing the final ideas.

Entry check (before lesson 1; about 10 minutes)

- **D1.** Calculate 6 × 4 and 24 ÷ 6. Explain how the two facts connect.
- **D2.** What is 1/4 of 20? Represent it with equal groups or a drawing.
- **D3.** Calculate 15 ÷ 4; a fraction or decimal is acceptable.
- **D4.** Describe where the point (2, 3) is on a first-quadrant coordinate grid.

Use responses diagnostically, not as an admission test. If D1 or D2 is uncertain, rehearse equal-group models before ratio scaling. If D3 is uncertain, revisit sharing 15 into four equal groups before lesson 3. If D4 is uncertain, model horizontal-first, vertical-second plotting before lesson 2; do not interpret an axis-reading error as a ratio error.

Entry-check answer guide

- **D1:** 24 and 4. Six groups of 4 make 24; sharing 24 equally among 6 groups returns 4 per group.
- **D2:** 5. Split 20 into four equal groups and take one. If the learner takes away 4, distinguish “one of four equal parts” from “four fewer.”
- **D3:** 15/4 = 3 3/4 = 3.75. Four groups of 3 use 12; the remaining 3 shared four ways give 3/4 per group. This prepares a fractional unit rate.
- **D4:** From the origin, move 2 units horizontally right and 3 vertically up. The coordinates refer to axis scales, not necessarily two and three physical grid boxes if those boxes use different units.

Lesson 1: The order and the whole

Time: approximately 50 minutes (extend when needed)

Status: written, unreviewed AI draft; not classroom-tested. Author: GPT-6 Astra, 4 November 2026. Original text: CC0 1.0.

Unit overview · Mathematics progression

Goal

Interpret and construct a ratio, and explain why “blue to gold” differs from “blue out of all tiles.”

Materials

Paper and pencil; optional counters in two labeled types. Use labeled shapes rather than color alone.

Steps

Success evidence: a learner labels both parts of 2:3, reverses it correctly when asked for gold:blue, and identifies the blue fraction of the total as 2/5.

✎ Retrieve (5 minutes)

1R. Draw two groups of 5 objects. How many objects are there? Write a multiplication statement.

✎ Explain and model (12 minutes)

Draw a small tile pattern as **B B G G G**, saying B means blue and G means gold; shape labels can substitute for colors. Say:

> A ratio compares two quantities in a stated order. Here, for every 2 blue tiles there are 3 gold tiles. Blue to gold is 2 to 3, written 2:3. Gold to blue is 3:2. The labels tell us which comparison we mean; 2:3 alone does not tell us what was counted.

Count all five tiles. Continue:

> Blue to all tiles is 2:5. Blue tiles are 2/5 of the total. The 3 in blue:gold = 2:3 counts only gold tiles; it is not the total. The quotient 2/3 can describe blue tiles per gold tile, but it is not the fraction of all tiles that are blue.

Worked example: A tray contains 4 round and 6 square counters. Round:square = 4:6; square:round = 6:4; round:all = 4:10. Round counters are 4/10 = 2/5 of the total. Group them into two copies of “2 round, 3 square”: the comparison round:square can also be written 2:3. This does not mean there are only 5 counters on the tray; a ratio need not tell the actual total.

Ask learners to point to the quantity counted by each number before calculating. Do not introduce cross-multiplication as a substitute for interpreting the comparison.

✎ Supported investigation (10 minutes)

1G. With counters or a drawing, make three copies of B B G G G. Record blue count, gold count, total, blue:gold, and the blue fraction of all tiles. Explain which quantities changed and which relationship stayed the same. A partner can describe the arrangement instead of moving counters.

If someone writes 6/9 for the fraction of all tiles that are blue, ask “Does the denominator count every tile?” Recount the total; do not merely tell them to add the ratio numbers without connecting that operation to the objects.

✎ Independent practice (15 minutes)

- **1P1.** A box has 6 triangles and 9 circles. Write triangle:circle, circle:triangle, and triangle:all. What fraction of the shapes are triangles?
- **1P2.** A card says “red:green = 3:2.” Could the card describe 12 red and 8 green tiles? Explain using groups.
- **1P3.** Sam says, “Red:green is 3:2, so 3/2 of all tiles are red.” Explain the error and give the red fraction of the total.
- **1P4.** Draw a collection with star:dot = 1:4 and 10 objects in total. Label the counts.

Exit and response (8 minutes)

1E. A collection has 8 striped and 12 plain cards. State striped:plain and the striped fraction of all cards. Explain why the two comparisons have different second numbers.

If the fraction is 8/12, repeat the whole-counting model with smaller counts before lesson 2. If correct but unexplained, ask the learner to label the denominator's referent. Accept an unreduced correct ratio; simplification is not the main goal here.

Vocabulary

Ratio: a comparison of two quantities in a stated order.

Order: which quantity is named first and which second.

Whole: the entire quantity whose parts are being considered.

Differentiation

- **Extra support:** Use labeled counters or drawings and count the whole before writing a fraction; use the specific 1G and 1E feedback in Steps. Offer large-print, tactile, spoken, or diagrammatic responses as appropriate; a physical access barrier is not itself evidence of a mathematical misconception.

- **Extra challenge:** Create a new example of the same kind with different numbers, solve it, and verify the relationship with a second representation. This is optional, not a new required topic.

⚠ Safety

No food, purchase, or specialist equipment is required. Use drawn counters instead of small loose objects when those are unsuitable for the learners. All purchase and travel contexts are fictional; do not request personal financial information.

Teacher notes

Misconception responses appear beside the relevant tasks in Steps. The answers below are examples, not required scripts: accept equivalent correct representations and explanations. This key is unreviewed; check before classroom use.

- **1R:** 10 objects; 2 × 5 = 10 represents two groups of 5. If a learner writes 5 × 2, ask how their drawing matches their convention rather than rejecting the equal product.
- **1G:** 6 blue, 9 gold, 15 total; blue:gold = 6:9 = 2:3; blue fraction = 6/15 = 2/5. Counts tripled; the blue-to-gold relationship and blue share of the whole did not change.
- **1P1:** Triangle:circle = 6:9 (or 2:3); circle:triangle = 9:6 (or 3:2); triangle:all = 6:15 (or 2:5); fraction triangles = 6/15 = 2/5. Reversed answers need label checks, not just more simplification practice.
- **1P2:** Yes. Four copies of 3 red and 2 green make 12 red and 8 green. Both counts use the same factor, 4.
- **1P3:** The 2 counts green tiles, not all tiles. Each basic group has 3 + 2 = 5 tiles; 3/5 of all tiles are red. A part of this whole cannot exceed the whole, so 3/2 is also an unreasonable red fraction.
- **1P4:** 2 stars and 8 dots; two groups of 1 star and 4 dots give 10 objects. Five objects would meet the ratio but not the specified total.
- **1E:** Striped:plain = 8:12 = 2:3. Striped fraction of all = 8/20 = 2/5. Twelve counts plain cards; 20 counts every card. Simplifying cannot repair choosing the wrong denominator.

Lesson 2: Scaling, tables, and coordinates

Time: approximately 50 minutes (extend when needed)

Status: written, unreviewed AI draft; not classroom-tested. Author: GPT-6 Astra, 4 November 2026. Original text: CC0 1.0.

Unit overview · Mathematics progression

Goal

Generate equivalent ratios by multiplying or dividing both quantities by the same positive factor, and connect a table to a coordinate plot.

Materials

Paper and pencil; optional grid paper or an accessible coordinate grid. Use labeled shapes rather than color alone.

Steps

Success evidence: labels axes, gives missing values with a common factor, and rejects adding the same amount as a general equivalence rule.

✎ Retrieve (5 minutes)

2R. In blue:gold = 2:3, what fraction of all tiles is gold? Explain.

✎ Explain and model (12 minutes)

Return to B B G G G. Two copies give 4 blue and 6 gold; three copies give 6 blue and 9 gold. Each new group contains both kinds in the same relationship.

Worked table:

Blue tiles	Gold tiles	Total tiles
2	3	5
4	6	10
6	9	15
10	15	25

Say:

> To turn 2 blue into 10 blue, multiply by 5. The gold count must also multiply by 5, giving 15. Adding 8 to each original count would give 10 blue and 11 gold; that is a different mixture. The required operation preserves equal groups, not equal differences.

Draw a grid. Label horizontal axis **blue tiles**, vertical axis **gold tiles**, and use equal spacing for equal numerical increments on each axis. Plot (2,3), (4,6), (6,9), and (10,15). Read each coordinate pair as a sentence. These points lie on a line through the origin, but we are counting whole tiles: not every point on the continuous line represents an available collection. At (0,0) neither type is present; it is a useful zero-quantity starting point, not a defined ratio 0:0.

An alternative double number line has blue labels 0,2,4,6 and aligned gold labels 0,3,6,9. Put corresponding labels vertically above one another. It represents the same pairs as the table, rather than two unrelated scales.

Supported work (10 minutes)

2G. A paper design uses 3 square pieces for every 4 triangular pieces. Complete square counts 3, 6, 9, 15 with corresponding triangle counts. Plot the four pairs with squares horizontal. Explain the point with horizontal coordinate 9. Use a table-only explanation if the physical plotting format is inaccessible, while still identifying both coordinates.

✎ Independent practice (15 minutes)

- **2P1.** Complete blue:gold = 2:3 pairs: (8, **), (** , 18), (14, __).
- **2P2.** Which pair keeps that same relationship: (6,7), (8,12), or (10,12)? Explain why at least one rejected pair fails.
- **2P3.** Pattern A uses 2 blue for 3 gold. Pattern B uses 3 blue for 5 gold. Compare their blue counts when each has 15 gold tiles. Which has more blue **per gold tile**?
- **2P4.** Lee changes 4:6 to 8:10 by adding 4 to each number. Does this preserve the ratio? Give a counterexample using equal groups, a table, or quotients.

Exit and response (8 minutes)

2E. A pattern has circle:square = 3:5. How many squares go with 12 circles? Describe the common scaling factor and the coordinate pair if circles are horizontal.

If a learner adds 9 to both counts, build four copies of a 3-and-5 group. If only coordinates are reversed, address axis order separately. Do not require formal slope terminology yet.

Vocabulary

Equivalent ratios: comparisons that express the same multiplicative relationship.

Scale factor: the number by which both quantities are multiplied to make another equivalent pair.

Coordinate pair: two numbers giving horizontal and vertical positions, in that order, on labeled axes.

Differentiation

- **Extra support:** Build repeated groups before completing the table; check axis order separately from ratio scaling using the 2E feedback. Offer large-print, tactile, spoken, or

diagrammatic responses as appropriate; a physical access barrier is not itself evidence of a mathematical misconception.

- **Extra challenge:** Create a new example of the same kind with different numbers, solve it, and verify the relationship with a second representation. This is optional, not a new required topic.

⚠ Safety

No food, purchase, or specialist equipment is required. Use drawn counters instead of small loose objects when those are unsuitable for the learners. All purchase and travel contexts are fictional; do not request personal financial information.

Teacher notes

Misconception responses appear beside the relevant tasks in Steps. The answers below are examples, not required scripts: accept equivalent correct representations and explanations. This key is unreviewed; check before classroom use.

- **2R:** 3/5. There are 3 gold tiles out of 2 + 3 = 5 in each basic group.
- **2G:** Pairs (3,4), (6,8), (9,12), (15,20). At horizontal coordinate 9 there are 9 squares and 12 triangles. Every point must use square count first and triangle count second; scale factors from (3,4) are 1, 2, 3, and 5. Plot those points on labeled, consistently scaled axes.
- **2P1:** (8,12), (12,18), (14,21). Common factors from (2,3) are 4, 6, and 7 respectively.
- **2P2:** (8,12) only. Four copies of (2,3) give (8,12). Six blue require 9 gold, not 7; 10 blue require 15 gold, not 12.
- **2P3:** A has 10 blue and B has 9 blue when each has 15 gold. A therefore has more blue per gold tile. Using a common gold count makes the comparison fair; comparing the original blue counts 2 and 3 alone would not.
- **2P4:** No. Doubling 4:6 gives 8:12, not 8:10. Equivalently, 4/6 = 2/3 and 8/10 = 4/5 are different. Adding the same amount keeps a difference, not generally a ratio.
- **2E:** 20 squares; factor 4; coordinate pair (12,20). Twelve is four times 3, so the square count is four times 5. A plotting error with a correct table should be addressed as a representation issue.

Lesson 3: One unit, useful units

Time: approximately 50 minutes (extend when needed)

Status: written, unreviewed AI draft; not classroom-tested. Author: GPT-6 Astra, 4 November 2026. Original text: CC0 1.0.

Unit overview · Mathematics progression

Goal

Find a unit rate, state what its units mean, and use a supplied conversion relationship.

Materials

Paper and pencil; optional calculator after the relationship has been represented. Use labeled shapes rather than color alone.

Steps

Success evidence: chooses the correct division for a requested rate, interprets a fractional answer, and changes a unit without changing the physical quantity.

✎ Retrieve (5 minutes)

3R. Five identical packs contain 30 cards in total. How many cards are in one pack?

✎ Explain and model (12 minutes)

Say:

> A rate relates quantities with their units attached. A unit rate tells how much of one quantity goes with one unit of the other. Decide which unit you want to make "one" before dividing.

Worked example A: Eight notebooks cost 12 units of currency. Cost per notebook = 12 ÷ 8 = **1.5 currency units/notebook**. At this price, 20 notebooks cost 20 × 1.5 = **30 currency units**. This assumes the same price for each notebook and no extra fees. The reverse rate is 8/12 = 2/3 notebook per currency unit; it answers a different question, not a second price.

Worked example B: A model vehicle covers 18 meters in 6 seconds at constant speed. Its speed is 18 ÷ 6 = **3 m/s**. In 10 seconds it covers **30 m** under that assumption. A real journey can have an average speed without moving at that speed every moment; the constant-speed condition is what licenses this prediction.

Worked example C: Use **1 m = 100 cm**. A ribbon is 250 cm long. Groups of 100 cm make meters, so 250 ÷ 100 = **2.5 m**. Conversely, 1.2 m = 1.2 × 100 = **120 cm**. The number gets

smaller when using the larger unit, but the ribbon does not shrink. Keep the unit label beside every answer.

Supported work (10 minutes)

3G. Offer A has 6 identical pencils for 9 currency units; offer B has 10 for 14. Find each price per pencil and decide which has the lower unit price. Then discuss why “lower unit price” does not alone prove which purchase someone should make. No actual purchase is involved.

If a learner divides pencil count by price, ask them to complete the sentence “___ currency units for one pencil” and identify which original quantity is being shared among pencils.

✎ Independent practice (15 minutes)

- **3P1.** A printing service charges 15 currency units for 20 identical pages. What is the cost per page, as a fraction and decimal? What would 8 pages cost at the same rate with no additional charge?
- **3P2.** A cart travels 42 m in 7 s at constant speed. Find its speed and its distance in 12 s at that speed.
- **3P3.** Using 1 m = 100 cm, convert 360 cm to meters and 0.75 m to centimeters.
- **3P4.** Using 1 h = 60 min, convert 2.5 h to minutes. Explain why multiplying, not dividing, is appropriate.

Exit and response (8 minutes)

3E. Nine identical folders cost 18 currency units. Give the unit price and the cost of 7 folders at that price. Then convert a 180 cm shelf length into meters using 1 m = 100 cm.

If a unit price is inverted, return to the sentence frame. If conversion direction is uncertain, compare the size of the two units and estimate before calculating. Correct arithmetic with missing units needs a labeling check, not a wholly new lesson.

Vocabulary

Unit rate: the amount of one quantity for one unit of another.

Constant speed: the same distance traveled in every equal time interval.

Conversion: expressing the same quantity using a different unit.

Differentiation

- **Extra support:** Complete the sentence “currency units for one item” before dividing; estimate the direction of a conversion as in 3E. Offer large-print, tactile, spoken, or diagrammatic responses as appropriate; a physical access barrier is not itself evidence of a mathematical misconception.
- **Extra challenge:** Create a new example of the same kind with different numbers, solve it, and verify the relationship with a second representation. This is optional, not a new required topic.

⚠ Safety

No food, purchase, or specialist equipment is required. Use drawn counters instead of small loose objects when those are unsuitable for the learners. All purchase and travel contexts are fictional; do not request personal financial information.

Teacher notes

Misconception responses appear beside the relevant tasks in Steps. The answers below are examples, not required scripts: accept equivalent correct representations and explanations. This key is unreviewed; check before classroom use.

- **3R:** 6 cards per pack, because 30 ÷ 5 = 6.
- **3G:** A: 9/6 = 1.5 currency units/pencil. B: 14/10 = 1.4 currency units/pencil. B has the lower unit price by 0.1 currency unit/pencil. Purchase needs can also depend on quantity needed, total money available, quality, and unused surplus; no personal household disclosure is needed. If only full packs can be bought, a unit price does not imply one pencil can actually be purchased at that price.
- **3P1:** 15/20 = 3/4 = 0.75 currency unit/page; 8 pages cost 8 × 0.75 = 6 currency units under the stated pricing assumption.
- **3P2:** 42/7 = 6 m/s; 12 × 6 = 72 m. Constant speed supplies the reason the same unit rate applies throughout.
- **3P3:** 360 cm = 3.6 m; 0.75 m = 75 cm. The first divides by 100 centimeters per meter; the second uses 100 centimeters in each meter.
- **3P4:** 150 min. Each hour contains 60 minutes, so 2.5 × 60 = 150. More of the smaller unit is needed to describe the same duration.
- **3E:** 2 currency units/folder; 7 cost 14 currency units. The shelf is 1.8 m long. Do not combine the pricing and measurement values; they are separate questions.

Lesson 4: Percent names the reference whole

Time: approximately 50 minutes (extend when needed)

Status: written, unreviewed AI draft; not classroom-tested. Author: GPT-6 Astra, 4 November 2026. Original text: CC0 1.0.

Unit overview · Mathematics progression

Goal

Interpret percent as a rate per 100 and solve both part-from-whole and whole-from-part questions.

Materials

Paper and pencil; optional calculator after the relationship has been represented. Use labeled shapes rather than color alone.

Steps

Success evidence: identifies the whole before calculating and checks that the resulting part and whole have the stated percent relationship.

✎ Retrieve (5 minutes)

4R. Find 1/2 of 40 and 1/4 of 40. What percentages correspond to these fractions?

✎ Explain and model (12 minutes)

Draw a 10-by-10 grid with 100 cells, or describe 100 equal shares. Say:

> Percent means per hundred. Forty percent of a whole means 40 out of every 100 equal shares of that whole. The whole need not contain exactly 100 objects. A percent tells a relationship, so we must say what the whole is.

Worked example A: Find 30% of 80 cards. Ten percent of 80 is 8; three such parts are **24 cards**. Equivalently, (30/100) × 80 = 24. Check: 24/80 = 3/10 = 30/100. Avoid saying “remove two zeros” as an explanation.

Worked example B: Twelve cards are 25% of a collection. Find the whole collection. Since 25% is 1/4, 12 is one quarter, so the whole is **4 × 12 = 48 cards**. Check: 25% of 48 is 12. Calculating 25% of 12 instead would answer a different question.

Worked example C: Eighteen of 60 cards are striped. What percentage is striped? 18/60 = 3/10 = 30/100, so **30%**. The denominator 60 is the whole collection; 18/(60 − 18) compares striped with plain instead.

Supported work (10 minutes)

4G. A fictional garden diagram has 50 equal squares. Thirty percent are labeled flowers. How many flower squares are there? Separately, another diagram has 14 flower squares, which are 20% of its total. Find that diagram's total. Name the known whole in the first question and the unknown whole in the second.

If students multiply 14 by 0.20, draw five equal parts representing the whole and put 14 in one part. Emphasize that both problems use percent but ask for different missing quantities.

✎ Independent practice (15 minutes)

- **4P1.** Find 15% of 200 stickers. Show a method using 10% and 5%, or a fraction/decimal calculation.
- **4P2.** Eighteen blue counters are 30% of all counters. How many counters are there in total?
- **4P3.** Fifteen of 60 books have a triangle label. What percent have that label?
- **4P4.** A collection has red:blue = 2:3. What percent of all objects are red? Explain why using 2/3 as the red fraction gives the wrong reference whole.

Exit and response (8 minutes)

4E. Eight cards are 20% of a pack. Find the total pack size and check your answer by finding 20% of it.

If a learner finds 1.6, ask which number their calculation treated as the whole. Restore the relationship with five equal groups before introducing any inverse-operation formula. This unit does not yet cover percentage increase/decrease or changing reference wholes in successive percent changes.

Vocabulary

Percent: a rate per hundred.

Part: the amount selected from a stated whole.

Whole: the quantity representing 100% in the comparison.

Differentiation

- **Extra support:** Draw equal groups representing 100% and label which amount is known; follow the 4G and 4E feedback when the part is mistaken for the whole. Offer large-print, tactile, spoken, or diagrammatic responses as appropriate; a physical access barrier is not itself evidence of a mathematical misconception.
- **Extra challenge:** Create a new example of the same kind with different numbers, solve it, and verify the relationship with a second representation. This is optional, not a new required topic.

⚠ Safety

No food, purchase, or specialist equipment is required. Use drawn counters instead of small loose objects when those are unsuitable for the learners. All purchase and travel contexts are fictional; do not request personal financial information.

Teacher notes

Misconception responses appear beside the relevant tasks in Steps. The answers below are examples, not required scripts: accept equivalent correct representations and explanations. This key is unreviewed; check before classroom use.

- **4R:** 20 and 10; 1/2 = 50% and 1/4 = 25%. The percentage names a share, not the count 20 or 10 independently of a whole.
- **4G:** First diagram: 15 flower squares, since 10% of 50 is 5 and 30% is three times that. Second diagram: 70 total squares, since 20% is one fifth and 14 × 5 = 70. The first known whole is 50; in the second, the 100% whole is initially unknown and resolves to 70.
- **4P1:** 30 stickers. Ten percent is 20 and five percent is 10; together they make 15%, or 30. Also 0.15 × 200 = 30.
- **4P2:** 60 counters. Thirty percent is 18, so 10% is 6 and 100% is 60. Check: 0.30 × 60 = 18. Finding 30% of 18 would mistake the part for the whole.
- **4P3:** 25%, since 15/60 = 1/4 = 25/100.
- **4P4:** 40%, because red:all = 2:5 and 2/5 = 40/100. The fraction 2/3 compares red with blue alone; it does not use the whole collection.
- **4E:** 40 cards; 20% = one fifth, so multiply 8 by 5. Check: 0.20 × 40 = 8. The answer must be greater than 8 because 8 is only a part of this pack.

Lesson 5: Use the relationship, check the claim

Time: approximately 50 minutes (extend when needed)

Status: written, unreviewed AI draft; not classroom-tested. Author: GPT-6 Astra, 4 November 2026. Original text: CC0 1.0.

Unit overview · Mathematics progression

Goal

Choose a useful representation and solve an unfamiliar combination of ratio, rate, percent, and conversion tasks.

Materials

Paper and pencil; optional calculator after the relationship has been represented. Use labeled shapes rather than color alone.

Steps

Synthesis (10 minutes)

5S. A design calls for 4 dark tiles for every 5 light tiles. Someone proposes 12 dark and 13 light. Decide whether it preserves the design and show a correction keeping 12 dark. Use objects, a table, or words. Discuss how “both numbers grew by 8” differs from preserving a relationship.

Review four questions learners can ask themselves:

1. What does each number count or measure?
2. What quantity, if any, is the whole?
3. What operation preserves the relationship?
4. Do the size and units of the answer make sense?

Individual assessment (25 minutes, extend as needed)

Diagrams, tables, and short written or spoken explanations are welcome. Record any arithmetic or reading support provided so that interpretation is fair. The teacher key offers diagnostic guidance, not a validated grading scale.

- **A1 — Meaning.** A box has 12 round counters and 18 square counters. Write round:square in simplest whole-number form, and give the fraction of all counters that are round. Explain what each denominator or second number counts.
- **A2 — Scale and plot.** A design uses 4 short strips for every 7 long strips. Complete the pairs (short, long): (8, **), (** , 35), (12, __). Plot the completed points with short strips on the horizontal axis and long strips on the vertical axis. Label axes and a consistent numerical scale.

- **A3 — Unit rate and comparison.** Pack A contains 8 identical sheets and costs 6 currency units. Pack B contains 12 identical sheets and costs 10 currency units. Which has the lower cost per sheet? Show both rates; exact fractions are acceptable.
- **A4 — Conversion.** A paper strip is 2.4 m long. Using 1 m = 100 cm, express its length in centimeters. Explain why the numerical value increases.
- **A5 — Percent of a whole.** A model has 150 tiles, 40% of which are textured. How many are textured? Show a calculation or representation.
- **A6 — Find the whole.** Twenty-one cards are 35% of a collection. How many cards are in the collection? Check the percent relationship.
- **A7 — Evaluate a claim.** “To change 3:5 into an equivalent ratio, add 2 to both numbers, making 5:7.” Is this method valid here? Explain, and give a correct equivalent ratio different from 3:5.

Feedback and transfer (15 minutes or next session)

Return to one problem with a correct answer but unclear explanation, and one problem with a useful representation but arithmetic error. Discuss the mathematics without naming learners or displaying their work without agreement. Invite a revision in a different representation; revision is part of learning, not proof the first answer was dishonest.

5T — Optional extension, not a grade-6 prerequisite: A fictional delivery service charges 3 currency units plus 2 for each package. Costs for 1, 2, and 3 packages are 5, 7, and 9. Does doubling the package count always double the cost? Explain with an example. This previews grade-7 proportionality; it should not become a hidden requirement for passing this unit.

Vocabulary

Reference whole: the quantity treated as the complete amount when stating a fraction or percent.

Unit rate: an amount for one unit of another quantity.

Equivalent ratios: comparisons preserving the same multiplicative relationship.

Differentiation

- **Extra support:** Use the diagnostic table in Teacher notes to select one earlier representation to revisit; allow oral or diagrammatic explanations without changing the relationship being assessed. Offer large-print, tactile, spoken, or diagrammatic responses as appropriate; a physical access barrier is not itself evidence of a mathematical misconception.
- **Extra challenge:** Create a new example of the same kind with different numbers, solve it, and verify the relationship with a second representation. This is optional, not a new required topic.

⚠ Safety

No food, purchase, or specialist equipment is required. Use drawn counters instead of small loose objects when those are unsuitable for the learners. All purchase and travel contexts are fictional; do not request personal financial information.

Teacher notes

Misconception responses appear beside the relevant tasks in Steps. The answers below are examples, not required scripts: accept equivalent correct representations and explanations. This key is unreviewed; check before classroom use.

Lesson 5 synthesis and extension

- **5S:** No; 12 dark is three times 4, so it needs 15 light, three times 5. Corrected pair: (12,15). Adding 8 to both gives different multipliers for the two counts.
- **5T:** No. One package costs 5; two cost 7, not 10. Doubling the package count doubles the package-related part of the cost, from 2 to 4 here; the rate stays 2 currency units per package and the fixed charge stays 3. Learners need not use the word “intercept.” This is an extension, not an assessment requirement.

Assessment answer guide

- **A1:** Round:square = **2:3**, simplified from 12:18 by dividing both counts by 6. Round fraction of all = **12/30 = 2/5**. The second ratio number, 3, denotes three equal ratio shares corresponding to the 18 square counters, not three actual counters; the fraction denominator refers to all counters (30 actual, or 5 equal ratio shares). A correct 2:3 with 2/3 for the fraction signals a reference-whole misconception.
- **A2: (8,14), (20,35), (12,21)**. Scale factors from (4,7) are 2, 5, and 3. Plots should have short strips horizontal, long strips vertical, labeled axes, and equally spaced numerical intervals on each axis. Different horizontal and vertical unit scales are allowed; equal numerical increments on the same axis must have equal physical spacing. These three coordinates provide a checkable plot key even without a printed graph.
- **A3: Pack A**. A costs 6/8 = **3/4 = 0.75** currency unit/sheet; B costs 10/12 = **5/6**, approximately **0.8333** currency unit/sheet. Exact comparison: 3/4 = 9/12 < 10/12 = 5/6. A smaller total pack price alone is insufficient reasoning; the pack counts differ.
- **A4: 240 cm**, since 2.4 × 100 = 240. A centimeter is smaller than a meter, so more centimeters count the same strip length. The strip did not physically grow.
- **A5: 60 tiles**. Ten percent of 150 is 15, so 40% is 4 × 15 = 60; alternatively, (40/100) × 150. Textured:all = 60:150 = 2:5 = 40:100 checks the relationship.
- **A6: 60 cards**. If 35% is 21, then 5% is 3 and 100% is 20 × 3 = 60. Alternatively, 21 ÷ 0.35 = 60. Check: 0.35 × 60 = 21. Multiplying 21 by 0.35 incorrectly treats the given part as the whole.
- **A7: Not valid here.** The proposed ratio 5:7 does not equal 3:5; for example, multiplying 3 by 5/3 would require multiplying 5 by 5/3, yielding 25/3 rather than 7. A whole-number comparison is to scale 3:5 to **21:35** and 5:7 to **25:35**: the same second quantity goes with different first quantities; or use 3/5 = 0.6 and 5/7 ≈ 0.714. A correct equivalent ratio is **6:10** by doubling both original counts. The intended accessible explanation is that changing 3 to 5 is not the same factor as changing 5 to 7; a diagram can show the mismatch.

Diagnostic recording, not a validated pass score

For each outcome record **demonstrated**, **partial evidence**, or **needs another check**, with a short example from the student's work. “Demonstrated” requires the relevant computation or

representation plus a sound interpretation; it does not require the wording above. Avoid combining these categories into a pseudo-precise mastery percentage.

Evidence	If uncertain, revisit
A1 ratio order and reference whole	Lesson 1: count and label each set
A2 scaling and plot; A7 equivalence explanation	Lesson 2: copies of a basic group; coordinates separately
A3 cost per one sheet	Lesson 3: decide the denominator unit before dividing
A4 conversion	Lesson 3: same length, different-sized units
A5 known whole; A6 unknown whole	Lesson 4: identify and draw the whole before calculating

Keep A2's table and graph observations separate. A learner who cannot physically draw a graph may demonstrate the same coordinate relationship using a tactile grid or precise coordinate placement instructions. If reading, language, or arithmetic support was provided, record it factually rather than assuming the mathematical reasoning is absent. Re-teach the specific gap, offer a fresh analogous task, and check again. Classroom educators must choose reporting and progression policies; this draft supplies no normed test, diagnosis, or qualification decision.

Proportional relationships: what stays constant?

Subject: Mathematics Grade: 7 Lessons: 5 Time per lesson: about 60 minutes

Status: written (unreviewed AI draft; not human-educator-reviewed or classroom-tested)

Author: GPT-6 Astra

Big idea

In a proportional relationship, multiplying one quantity by a factor multiplies the other by the same factor. Its equation is y = kx: the rate y/x stays constant for positive x. A percentage calculation also needs a clearly identified reference whole, which can change from one step to the next.

What students should be able to do

- Compute a unit rate from fractional quantities, label its units, and distinguish it from the inverse rate.
- Distinguish proportional from nonproportional relationships in tables, verbal rules and graphs.
- Write y = kx and explain the constant k and points (0, 0) and (1, k), using the quantities and units on the axes.
- Calculate percent increase or decrease and successive percentages with the correct reference whole at each step.
- Find an original amount from a stated final percentage and explain a simple-interest model.

What students should already know

Students need whole-number and fractional unit rates, percent of a whole, fraction multiplication and division, decimal operations, and nonnegative coordinate pairs. The grade 6 ratios unit supplies the ratio and percent foundation; this is not a replacement for instruction in fraction division.

Use these three diagnostic questions without a time limit. Ask for a representation or explanation as well as a result:

1. Three identical notebooks cost 6 currency units, with no fee. What is the cost per notebook?
2. Find 25% of 80.
3. How many halves are in three quarters? Calculate (3/4) ÷ (1/2).

Diagnostic guide: (1) 6 ÷ 3 = 2 currency units per notebook. (2) One quarter of 80 is 20. (3) Three quarters contains one and a half halves, so the quotient is 3/2. A strip divided into quarters makes the comparison visible. These questions are not an admission gate: revisit equal groups, a 100% bar, or fraction strips where needed before combining the ideas.

Lesson list

1. A rate when both quantities are fractions: compute and interpret rates, including inverse units.
2. A straight line is not enough: connect rules, tables, graphs and the origin.
3. Percent change needs a starting whole: distinguish change from final amount and identify the denominator.
4. Two percentages, two reference wholes: successive changes, reverse percent and fees.
5. Choose the model, explain the result: simple interest, synthesis and an eight-task assessment.

Materials (whole unit)

Paper, pencil, ruler, and optional grid paper or tactile grid; fraction strips can be drawn rather than purchased. Offer large-print pages and verbal descriptions. A calculator is optional after a student has written or described the intended calculation. No internet, purchases, food preparation or personal financial information is required.

All currency amounts and rates are fictional arithmetic examples. Substitute a locally familiar currency label if helpful, without changing the stated mathematical rule. These are not actual tax rules or financial advice. Counts of indivisible packs use whole-number inputs; lengths, times and volumes may use fractional inputs.

Assessment

Use lesson 5's A1–A8 tasks and worked guide. Accept oral explanations, labelled drawings or equations; do not score speed or handwriting. Look separately for rate direction and units, proportional-model recognition, graph interpretation, and correct percent bases. Use errors to select a worked example for revisiting, then offer a similar new question. There is no validated pass threshold or claim that eight tasks measure all grade 7 mathematics.

Sources

The Common Core grade 7 Ratios and Proportional Relationships reference was consulted on November 4, 2026. 7.RP.A.1 informed fractional unit rates; 7.RP.A.2a–d informed tables, graphs, equations and point interpretation; 7.RP.A.3 informed multi-step ratio and percent problems. This is a scope cross-reference, not accreditation, a complete alignment audit, or a full grade 7 course. Examples and explanations here are original CC0 material; the linked reference is not relicensed by this repository.

See also the proposed mathematics progression.

Known gaps and cautions

Pacing is an untested estimate. Split lessons, especially lessons 4 and 5, if explanation or practice needs more time. A qualified local educator should check language, access needs, prerequisites, curriculum requirements and examples before classroom use. An agent peer check is not human educator review.

The unit uses nonnegative quantities and does not develop general functions on negative inputs. It is not a finance course. Compound interest appears only as an optional contrast; percent error, commission and other contexts are not exhaustively covered. Data agreeing with a model at

several points does not prove that it holds at unobserved values. Explicit rules in the exercises are assumptions, not empirical claims about equipment, motion or prices.

Lesson 1: A rate when both quantities are fractions

Time: about 60 minutes (untested estimate; split if needed)

Status: unreviewed AI draft; not classroom-tested. Author: GPT-6 Astra.

Goal

Compute a unit rate from fractional quantities and explain why reversing the division changes both the rate and its units.

Materials

Paper, pencil, optional fraction strips and calculator. Ribbon is a fictional measured quantity: no cutting or purchases are needed.

Steps

✎ 1. Opening — 5 minutes

O. In a fictional shop, 3 metres of ribbon cost 6 currency units, with a constant price per metre and no fee. Find the price per metre. Ask students to name the quantity that should become **one**, rather than starting with a memorized division rule.

✎ 2. Main activity: worked model — 15 minutes

Display: “Three quarters of a metre cost nine eighths of a currency unit, at a constant price per metre.” Write the question in words: **How much currency for one metre?**

Draw a one-metre strip divided into four quarters. Label three quarters together 9/8 currency units. One quarter costs (9/8) ÷ 3 = 3/8. Four quarters cost 4 × 3/8 = 12/8 = 3/2 currency units.

Length (metres)	Cost (currency units)
0	0
1/4	3/8
3/4	9/8
1	3/2

Connect the strip to division: (9/8) ÷ (3/4) = (9/8) × (4/3) = 3/2 **currency units per metre**. Multiplying both the length and the cost by 4/3 turns 3/4 metre into one metre. The fraction calculation and the strip describe the same scaling.

Write cost = (3/2) × length, when length is measured in metres. For continuous ribbon sold by length, fractional metre inputs are allowed in this model.

Now reverse the question: “How many metres for one currency unit?” The calculation is (3/4) ÷ (9/8) = 2/3 **metre per currency unit**. Both rates are correct, but they answer different questions. Do not drop the units when comparing them.

3. Guided work — 10 minutes

G. A constant-motion model travels 5/6 kilometre in 1/3 hour. Find kilometres per hour and the distance in 1/2 hour. Have students first scale the time to one hour, then use the rate for half an hour. A single journey's average rate does not by itself establish that the speed stays constant; here constancy is part of the stated model.

✎ 4. Independent practice — 20 minutes

For each task, write the division with units or describe the scaling. A calculator may check the arithmetic after the model is chosen.

- **P1.** A constant-price ribbon model gives 2/3 metre for 5/6 currency unit. Find currency units per metre and the cost of 2 metres.
- **P2.** In a constant-flow model, 3/5 litre fills in 2/5 minute. Find litres per minute and the time needed for 2 litres.
- **P3.** A length of 3/8 metre costs 3/4 currency unit. Find both currency units per metre and metres per currency unit.
- **P4.** Someone divides 3/4 metre by 9/8 currency units and reports “2/3 currency unit per metre.” Explain the mistake and give the price per metre.

5. Discussion — 5 minutes

D. Why can two different numbers both be correct unit rates for the same purchase? Ask for the question each answers, not just the phrase “flip it.”

✓ 6. Closing check — 5 minutes

E. A constant-motion model travels 7/10 kilometre in 1/5 hour. Find kilometres per hour and the distance in 2/5 hour.

Answer guide

- **O:** 6 ÷ 3 = 2 currency units per metre; multiplying 2 by 3 metres gives the original cost 6.
- **G:** (5/6) ÷ (1/3) = (5/6) × 3 = 5/2 kilometres per hour. Half an hour gives (5/2) × (1/2) = 5/4 kilometres. Alternatively, half an hour is 3/2 times the given time, so multiply the given distance by 3/2 too.
- **P1:** (5/6) ÷ (2/3) = 5/4 currency units per metre. Two metres cost (5/4) × 2 = 5/2 currency units.
- **P2:** (3/5) ÷ (2/5) = 3/2 litres per minute. Time = 2 ÷ (3/2) = 4/3 minutes. Check: (3/2) × (4/3) = 2 litres.
- **P3:** (3/4) ÷ (3/8) = 2 currency units per metre; (3/8) ÷ (3/4) = 1/2 metre per currency unit. The reciprocal has different units.
- **P4:** The division produces 2/3 **metre per currency unit**, not currency per metre. For the requested price, (9/8) ÷ (3/4) = 3/2 currency units per metre.

- **D:** “One rate tells me the cost of one metre; the other tells me the length bought for one currency unit. I must say which one I want.”
- **E:** (7/10) ÷ (1/5) = 7/2 kilometres per hour. In 2/5 hour the distance is (7/2) × (2/5) = 7/5 kilometres. This is twice the original distance because the time doubled.

Vocabulary

- **Unit rate:** amount of one quantity for one unit of another, with units specified.
- **Inverse rate:** the rate for the reversed question; for a nonzero rate its numerical value is the reciprocal when the units are reversed consistently.
- **Constant rate:** a rate that does not change within the stated model.

Differentiation

- **Extra support:** use the quarter-metre strip before symbolic fraction division. Read “currency divided by metres” aloud. Allow an oral answer with a labelled strip.
- **Extra challenge:** express the worked ribbon cost as y = kx. **Guide:** x is metres, y is currency units, k = 3/2 currency units per metre. Fractional nonnegative x values are meaningful for this continuous-length model.

⚠ Safety

Use paper models. Do not enact speed or liquid-flow experiments. No purchases or disclosure of personal spending are needed.

Teacher notes

A correct number with reversed units is not yet a correct interpretation. Ask “one of what?” before selecting the division. Fraction strips explain the scaling; a rule for dividing fractions should not replace that explanation. Keep the constant-rate assumption explicit when moving from an observed pair to another time or length.

Unit overview · Next lesson

Lesson 2: A straight line is not enough

Time: about 60 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: GPT-6 Astra.

Goal

Recognize a proportional relationship and connect its constant rate, equation and graph, including the meaning of the origin and the unit-rate point.

Materials

Paper, ruler, optional grid or tactile grid and calculator. Graphs may be described orally with labelled coordinates.

Steps

✎ 1. Opening — 5 minutes

O. Four identical cards cost 6 currency units, with a constant price per card and no fee. What does one card cost? What do eight cost? Name the assumption that permits the second calculation.

✎ 2. Main activity: worked comparison — 15 minutes

Two fictional equipment-use models relate hours x to cost y. Model A charges 3 currency units per hour with no fee: y = 3x. Model B charges a fixed access fee of 2 currency units plus 3 per hour: y = 2 + 3x. The access fee applies even at zero usage once access is purchased.

Hours x	A: cost y	B: cost y
0	0	2
1	3	5
2	6	8
4	12	14

For positive x, A has y/x = 3 at every listed point. B has ratios 5/1 = 5, 8/2 = 4, and 14/4 = 3.5. Its cost per hour of use is not constant even though the charge **for each additional hour** is constant.

Draw horizontal hours from 0 to 4 and vertical currency units from 0 to 14. Use equal spacing for equal numerical increments on each axis; the two axes need not use the same physical scale. Label the axes and plot both sets. Join each model's points with a straight line over nonnegative hours, since this example allows fractional hours and explicitly gives a linear rule. Only A's line passes through the origin.

Explain A's points: (0, 0) means no hours and no cost; (1, 3) means one hour costs 3 currency units, so k = 3 currency units per hour; (2, 6) means two hours cost 6. We do **not** calculate 0/0 at the origin. The rate is determined at positive x, and y = kx gives zero output at zero input.

A straight line alone is insufficient: B is straight. Passing through the origin alone is also insufficient: a curved or irregular relation can include (0, 0). A proportional graph has both properties, over its allowed domain. For discrete counts, the allowable points lie on such a line, but intermediate points may not be valid quantities.

3. Guided work — 10 minutes

G. Ribbon cost y in currency units is y = 2.5x, where x is length in metres. Plot or describe (0, 0), (1, 2.5), (4, 10) and find the point for 3 metres. Explain k and the unit-rate point.

✎ 4. Independent practice — 20 minutes

- **P1.** A table has x values 0, 2, 4, 6 metres and y values 0, 5, 10, 15 currency units. Does it fit a proportional model? State k and its equation. **Assuming that model continues**, find y when x = 10.
- **P2.** A table has x values 0, 1, 2, 3 and y values 0, 2, 5, 9. Does it fit a proportional model? Explain why the origin does not settle the question.
- **P3.** For length x in metres and cost y in currency units, compare y = 4x with y = 4 + x. Which is proportional? For the proportional model, explain (1, 4).
- **P4.** A stated proportional relationship includes (2, 7), with x in hours and y in currency units. Find k, the equation, the unit-rate point and the point for zero hours.

5. Discussion — 5 minutes

D. Does agreement with a proportional model at three measured positive inputs prove that all future measurements will fit it? Distinguish a pattern in data from an explicitly assumed rule.

✓ 6. Closing check — 5 minutes

E. Identical whole packs have x values 0, 3, 6 and costs y of 0, 12, 24 currency units, with a constant price per pack and no fee. Find k. Explain why (1, 4) is a valid purchase but (1/2, 2) is not allowed when only whole packs are sold, even though both lie on y = 4x.

Answer guide

- **O:** 6/4 = 1.5 currency units per card; eight cost 8 × 1.5 = 12. The price per card remains constant and no fixed fee is added.
- **G:** k = 2.5 currency units per metre. (1, 2.5) represents one metre costing 2.5 currency units. At 3 metres, y = 2.5 × 3 = 7.5, so the point is (3, 7.5). The stated rule gives a straight line through (0, 0).
- **P1:** Yes: 5/2 = 10/4 = 15/6 = 2.5 currency units per metre, and zero maps to zero. The fitted model is y = 2.5x; under the continuation assumption, y = 25 currency units at 10 metres.

- **P2:** No: the positive-input ratios are 2, 2.5 and 3, not one constant. Having (0, 0) does not fix this mismatch.
- **P3:** y = 4x is proportional, with k = 4 currency units per metre. (1, 4) means one metre costs 4 currency units. y = 4 + x is not proportional: zero length has cost 4, and the positive-input ratios differ.
- **P4:** k = 7/2 = 3.5 currency units per hour; y = 3.5x; unit-rate point (1, 3.5); zero-hours point (0, 0). No division by zero is used.
- **D:** “The measurements fit the model so far, but an unmeasured value might not. If the exercise gives the rule for the whole domain, I can calculate from that assumption.”
- **E:** k = 12/3 = 24/6 = 4 currency units per pack. One whole pack costs 4. The half-pack point is on the mathematical line but outside the allowed whole-pack inputs in this situation.

Vocabulary

- **Constant of proportionality k:** the fixed multiplier in y = kx; y/x for positive x in these examples.
- **Origin:** the point (0, 0).
- **Domain:** the allowed input values in a model.
- **Linear but nonproportional:** a straight-line relationship with a nonzero intercept, such as y = 2 + 3x.

Differentiation

- **Extra support:** say each coordinate as “horizontal quantity, then vertical quantity.” Use a tactile grid, enlarged ticks or oral descriptions. Compare A and B at x = 0 before computing rates.
- **Extra challenge:** reverse A's axes. **Guide:** hours = (1/3) × cost, so the reversed constant is 1/3 hour per currency unit, the reciprocal of 3 currency units per hour.

⚠ Safety

This is a paper activity; no equipment hire or other purchase is needed.

Teacher notes

Equal increases in y for equal increases in x establish a straight-line pattern in a table, not necessarily proportionality. Avoid calling y = 2 + 3x proportional because its “rate” is 3: its slope is 3, but its total y/x is not constant. A finite table is evidence of fit, not proof about unobserved data. For discrete contexts, draw or describe allowable points separately from the containing line.

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Lesson 3: Percent change needs a starting whole

Time: about 60 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: GPT-6 Astra.

Goal

Calculate percent increase or decrease using the original amount as the reference whole, and distinguish the change from the final amount.

Materials

Paper, pencil, optional calculator and drawn or tactile percentage bar.

Steps

✎ 1. Opening — 5 minutes

O. Find 30% of 50. Name the whole and say whether your answer is the part or the whole.

✎ 2. Main activity: worked comparison — 15 minutes

Display: “A collection grows from 80 counters to 100 counters.” The increase is 100 − 80 = 20 counters. Percent increase compares that change to the **starting** 80:

percent increase = (20/80) × 100% = 25%.

Draw a bar for 80 counters, labelled 100%. Divide it into four equal parts: each represents 20 counters, or 25% of the original. Add one more such part. The final 100 counters represent 125% of the original 80, not 25% of it.

Connect the representations:

- Increase: 0.25 × 80 = 20 counters.
- Final amount: 80 + 20 = 100 counters.
- Equivalent multiplier: 1.25 × 80 = 100 counters.

Now reverse the journey: “A collection shrinks from 100 counters to 80.” The decrease is still 20 counters, but the starting whole is now 100. Percent decrease = (20/100) × 100% = 20%. Draw a fresh bar labelled 100 counters = 100%; do not reuse the old 100% label on 80.

For a percent change written as a decimal r, an increase gives final amount = original × (1 + r); a decrease gives final amount = original × (1 − r). These percent-change calculations require a positive original amount. Here decreases have $0 \le r \le 1$ so the final amount is

nonnegative. A 100% decrease leaves zero; an increase can exceed 100%. Multipliers describe the final amount, not just the change.

3. Guided work — 10 minutes

G. A length changes from 60 centimetres to 45 centimetres. Find the decrease in centimetres, the percent decrease, and the final length as a percentage of the original. Ask students to label 100% before calculating.

✎ 4. Independent practice — 20 minutes

For each answer, name the original whole and include a checking calculation.

- **P1.** A count grows from 50 to 65. Find the percent increase.
- **P2.** A length shrinks from 120 centimetres to 90 centimetres. Find the percent decrease.
- **P3.** Increase 30 counters by 40%. Find the increase and the final count; explain why the two answers differ.
- **P4.** Someone says, “80 to 100 is a 20% increase because 20/100 = 0.20.” Identify the wrong reference whole. What is the correct percent increase, and what is the percent decrease for 100 to 80?

5. Discussion — 5 minutes

D. Why do the forward and backward changes between 80 and 100 have different percentages even though both involve 20 counters?

✓ 6. Closing check — 5 minutes

E. A count grows from 200 to 230. Find the percent increase. Complete: “230 is ___% of 200.”

Answer guide

- **O:** 0.30 × 50 = 15. The whole is 50; 15 is the 30% part. It is not a new total unless a problem specifies how that part is used.
- **G:** Decrease = 60 − 45 = 15 centimetres. Percent decrease = (15/60) × 100% = 25%. Final length is 75% of the original: 0.75 × 60 = 45 centimetres.
- **P1:** Increase = 65 − 50 = 15; (15/50) × 100% = 30%. Check: 1.30 × 50 = 65.
- **P2:** Decrease = 120 − 90 = 30 centimetres; (30/120) × 100% = 25%. Check: 0.75 × 120 = 90 centimetres.
- **P3:** Increase = 0.40 × 30 = 12 counters. Final count = 30 + 12 = 42 counters, or 1.40 × 30. The increase alone omits the original 30 counters.
- **P4:** The increase starts at 80, not 100: 20/80 = 0.25, so the increase is 25%. The reverse starts at 100: 20/100 = 0.20, so the decrease is 20%.
- **D:** “The numerator, 20 counters, is the same, but the denominator is the starting whole. Twenty is a larger fraction of 80 than of 100.”
- **E:** Increase = 30; (30/200) × 100% = 15%. The final 230 is 115% of 200 because 1.15 × 200 = 230.

Vocabulary

- **Reference whole:** the amount that represents 100% in a calculation.
- **Percent increase/decrease:** the increase/decrease divided by the original positive amount, expressed as a percentage.
- **Multiplier:** the factor applied to the original amount to obtain the final amount.

Differentiation

- **Extra support:** draw and label the starting 100% bar before finding any part. Use “starting,” “change” and “final” as three separate labels. Offer oral explanations or a calculator once the reference whole is chosen.
- **Extra challenge:** increase 12 by 150%. **Guide:** the increase is $1.5 \times 12 = 18$; the final amount is $12 + 18 = 30$, or 2.5×12. An increase larger than the original amount is possible.

⚠ Safety

Use fictional counts and lengths, not body measurements, personal income or comparisons between students.

Teacher notes

A final amount and a change are different quantities. “25% increase” means 125% remains relative to the original; “25% decrease” means 75% remains. Do not assume the same numerical change implies the same percentage when the starting whole changes. Percent change from an original amount of zero is undefined in this formula, not automatically 0% or 100%.

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Lesson 4: Two percentages, two reference wholes

Time: about 60 minutes (untested estimate; consider two sessions)

Status: unreviewed AI draft; not classroom-tested. Author: GPT-6 Astra.

Goal

Solve successive and reverse percentage problems by identifying the reference whole at each step.

Materials

Paper, pencil and optional calculator. All prices, taxes and fees are invented for arithmetic, not statements of current policy or financial advice.

Steps

✎ 1. Opening — 5 minutes

O. Find 10% of 90. Explain what amount represents 100%.

✎ 2. Main activity: worked model — 15 minutes

A fictional item costs 80 currency units. Its price is discounted by 25%. A fictional 10% tax is then calculated **on the discounted price**. Find the total.

Write a label for the base at each stage:

Stage	Reference whole	Calculation
Discount	80	0.25 × 80 = 20
Price after discount	80	80 − 20 = 60
Tax	60	0.10 × 60 = 6
Total	60	60 + 6 = 66

The two multipliers give the same result: 80 × 0.75 = 60, then 60 × 1.10 = 66 currency units. Do not calculate 80 × (1 − 0.25 + 0.10) = 68: that incorrectly uses 80 as the base for both percentages. The problem expressly makes 60 the tax base.

Use a bar labelled 80 = 100%, with a quarter removed. Relabel the remaining 60 as 100% **for the tax step**, then add a tenth of that new whole. The quantity did not change when its percentage label changed; the reference did.

Explain a reverse problem: if a final price is 72 after a 20% markdown, the final amount is 80% of the unknown original x. Thus 0.80x = 72 and x = 72 ÷ 0.80 = 90. Check forward: 90

× 0.80 = 72. Adding 20% of 72 is not the inverse operation, because that uses the wrong base.

3. Guided work — 10 minutes

G. A length of 50 centimetres increases by 20%, then decreases by 20% of its **new** length. Find both intermediate and final lengths and the net percent change from the original. Before calculation, ask whether the two changes must cancel; return to that prediction after calculating.

✎ 4. Independent practice — 20 minutes

Use the stated bases, not assumptions about real shops. Write the expression before using a calculator. In these fictional problems, round monetary results to the nearest 0.01 currency unit only at the end; the supplied examples already terminate exactly.

- **P1.** A price of 120 currency units has a 15% discount, followed by a 10% tax on the discounted price. Find discounted price, tax and total.
- **P2.** A count of 200 grows by 10%, then by another 10% of the new count. Find the final count and overall percent increase from 200.
- **P3.** A final price is 72 currency units after a 20% markdown. Find the original and check it. Explain why 72 × 1.20 does not recover it.
- **P4.** Policy A adds a 10% tax on an 80-currency-unit item, then adds a flat fee of 5. Policy B taxes the combined item and fee, 80 + 5, at 10%. Find each total. Why are they different?

5. Discussion — 5 minutes

D. Does the worked example establish that every real tax is calculated after a discount? What information must a real question specify? Explain why P4 needs more than two percentage multipliers.

✓ 6. Closing check — 5 minutes

E. Start with 60. Decrease it by 10%, then increase the result by 10%. Find the intermediate amount, final amount and net percent change from 60.

Answer guide

- **O:** 0.10 × 90 = 9; the reference whole is 90.
- **G:** 50 × 1.20 = 60 centimetres; then 60 × 0.80 = 48 centimetres. The increase was 10 centimetres, but the decrease was 12. The net decrease is 2/50 = 0.04 = 4%, not zero.
- **P1:** Discounted price = 120 × 0.85 = 102. Tax = 102 × 0.10 = 10.20. Total = 112.20 currency units.
- **P2:** 200 × 1.10 = 220, then 220 × 1.10 = 242. Increase = 42; 42/200 = 0.21 = 21%. The second increase was 22, not 20.
- **P3:** 0.80 × original = 72, so original = 72/0.80 = 90 currency units. Check: 90 × 0.80 = 72. The proposed 72 × 1.20 = 86.40 adds 20% of 72, not the 18 removed from the original 90.

- **P4:** A: 80 × 1.10 + 5 = 93. B: (80 + 5) × 1.10 = 93.50 currency units. Policy B also taxes the fee, adding 0.50. Neither fictional policy is a claim about local law.
- **D:** “No: the problem must state the tax base and any fees. Real rules may differ. A flat fee is addition, so I cannot treat every operation as multiplication.” With the same two pure percentage factors and no intermediate rounding, their product commutes; this fact does not make all fee policies interchangeable.
- **E:** 60 × 0.90 = 54, then 54 × 1.10 = 59.40. The net decrease is 0.60/60 = 0.01 = 1%.

Vocabulary

- **Successive changes:** changes applied one after another, potentially with different reference wholes.
- **Reverse percent:** finding the original amount when the final amount and its percentage of the original are known.
- **Flat fee:** a fixed amount added, not a percentage of the amount bought.

Differentiation

- **Extra support:** provide two boxes headed “base for this step” and “new amount.” Complete the worked example with a bar before using a combined expression. Split successive changes and reverse percent into separate sessions if needed.
- **Extra challenge:** a final amount is 150 after a 25% increase. Find the original. **Guide:** 1.25x = 150, so x = 120; check 120 × 1.25 = 150.

⚠ Safety

Do not ask students to reveal family purchases, tax bills, debt or income. No real transactions are part of this lesson.

Teacher notes

Equal percentage increases and decreases generally do not cancel because the second base has changed. In reverse percent, undo the multiplier by division; do not merely switch “increase” and “decrease.” Require an explicitly stated base for every tax or fee example. Currency rounding policies vary in real life; the rule here is only an exercise assumption.

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Lesson 5: Choose the model, explain the result

Time: about 60 minutes (untested estimate; assessment may need a separate session)

Status: unreviewed AI draft; not classroom-tested. Author: GPT-6 Astra.

Goal

Choose and explain proportional and percentage models, including a stated simple-interest model, and check results using units and reference wholes.

Materials

Paper, optional grid or tactile grid, ruler and calculator. No financial accounts, internet access or personal financial information are required.

Steps

✎ 1. Opening — 5 minutes

O. A stated proportional relationship includes (2, 9). Find k and write its equation.

✎ 2. Main activity: simple-interest worked example — 15 minutes

In a fictional arithmetic model, the principal, or starting amount, is 200 currency units. Simple interest is paid at 3% per year for two years, with no fees or payments in between. **Each year's interest is calculated on the original 200**, not on a growing balance.

One year's interest = 200 × 0.03 = 6 currency units. Two years' interest = 6 × 2 = 12. Final amount = 200 + 12 = 212 currency units.

Write I = Prt, where I is interest, P is principal, r is the annual rate written as a decimal, and t is time in years. Here I = 200 × 0.03 × 2 = 12. State that the formula describes this simple-interest assumption; it is not a universal account rule or an investment recommendation.

With P = 200 and r = 0.03 fixed, interest is I = 6t, proportional to time. But the **total amount** is A = 200 + 6t. It is not proportional to time: at zero years, the total is already 200, not zero. This connects the percent calculation to lesson 2's fixed-fee distinction.

3. Guided work — 5 minutes

G. Use simple interest with principal 150 currency units, annual rate 4%, and time three years. Find yearly interest, total interest and final amount. Explain which amount is the reference whole each year.

4. Individual synthesis and assessment — about 25 minutes

This is not a speed test; allow more time or another session. Give the prompts before the guide. Accept equations, labelled diagrams or oral explanations. Ask students to show the rate or percent base, not only a final number.

- **A1. Fractional rate.** At a constant price, 5/8 metre of ribbon costs 15/16 currency unit. Find currency units per metre and the cost of 2 metres.
- **A2. Table and equation.** Hours x are 0, 2, 5; costs y in currency units are 0, 7, 17.5. Does the table fit a proportional model? Give k, the equation and the meaning of (1, 3.5).
- **A3. Straight but not proportional.** The rule is y = 3 + 2x, where x is hours and y is currency units. Its table includes (0, 3), (1, 5), (2, 7). Explain why the rule is not proportional even though its graph is straight.
- **A4. Graph interpretation.** Volume x in litres and cost y in currency units follow y = 2x for continuous nonnegative volumes. Draw or describe a labelled graph including (0, 0), (1, 2) and (3, 6). Explain (3, 6) and how (0, 0) fits the model without dividing by zero.
- **A5. Change of base.** A count increases from 60 to 75, then later decreases from 75 to 60. Find the percent increase and percent decrease. Explain the difference.
- **A6. Successive percentages.** A fictional price of 150 currency units is discounted by 20%, then taxed at 5% of the discounted price. Find the final total, showing the tax base.
- **A7. Reverse percent.** An amount is 88 after a 10% increase. Find the original amount and check forward.
- **A8. Simple interest.** A fictional principal of 300 currency units receives 2% simple interest per year for four years, with no fees or intervening payments. Find the interest and final amount. Name the amount used as the percentage base each year.

5. Discussion — 5 minutes

D. Choose one assumption from today's models that would need checking in a real application. Explain what could change the answer if that assumption were false.

✓ 6. Closing check — 5 minutes

E. Explain why I = 5t is proportional to time t but A = 100 + 5t is not. Here t is years and both I and A are measured in currency units.

Worked answer guide

- **O:** k = 9/2 = 4.5; y = 4.5x. No units were specified in this abstract question.
- **G:** Yearly interest = 150 × 0.04 = 6 currency units; three years' interest = 18; final amount = 168. The original principal 150 is the reference whole every year.
- **A1:** (15/16) ÷ (5/8) = (15/16) × (8/5) = 3/2 currency units per metre. Two metres cost (3/2) × 2 = 3 currency units. Reverse units would answer a different question.
- **A2:** Yes: 7/2 = 17.5/5 = 3.5 currency units per hour; zero maps to zero. The fitted equation is y = 3.5x. (1, 3.5) means one hour costs 3.5 currency units under that model. The finite table fits; it does not alone prove unmeasured values.
- **A3:** At zero hours y = 3, not zero: the rule includes a fixed 3-currency-unit charge. Also 5/1 = 5 and 7/2 = 3.5 differ. The increase for each additional hour is constant, but the total cost per hour y/x is not.
- **A4:** Put volume in litres on the horizontal axis and cost in currency units on the vertical axis, with equally spaced numerical increments on each axis. The points lie on a straight line

through the origin; fractional inputs between them are permitted by the continuous-volume model. (3, 6) means 3 litres cost 6 currency units. At x = 0, y = 2 × 0 = 0; no 0/0 calculation is needed. The constant is 2 currency units per litre, read at (1, 2).
- **A5:** Increase = 15, based on 60: 15/60 = 0.25 = 25%. Decrease = 15, based on 75: 15/75 = 0.20 = 20%. The absolute changes match but their starting wholes differ.
- **A6:** Discounted price = 150 × 0.80 = 120. Tax base is 120, so tax = 120 × 0.05 = 6. Total = 126 currency units.
- **A7:** 1.10 × original = 88, so original = 88/1.10 = 80. Check: 80 × 1.10 = 88.
- **A8:** Yearly interest = 300 × 0.02 = 6 currency units. Four years' interest = 6 × 4 = 24. Final amount = 300 + 24 = 324. Every year's base is the original 300, not the balance after previous interest.
- **D:** Sample responses: “A fixed fee would change a pure cost-per-item model”; “Tax on the original rather than discounted price would change the tax”; “A rate observed during one interval might change later”; “Compound interest would use a growing balance rather than the original principal.” A specific assumption and consequence matter more than matching these words.
- **E:** I = 5t has constant I/t = 5 for positive t and gives I = 0 at t = 0. A = 100 + 5t starts at 100, so it is not of the form A = kt; its positive-time A/t is not constant. Its graph is nevertheless straight.

Feedback and next steps

Treat the competencies separately, not as a single speed or ability ranking:

- A1: if division is reversed, return to lesson 1's “one of what?” and units; if the setup is correct but arithmetic fails, support fraction division.
- A2–A4: distinguish a constant additional charge from a constant total ratio; revisit both the origin and a positive-input unit-rate point in lesson 2.
- A5: label the starting 100% whole separately for each direction, using lesson 3's bars.
- A6–A7: list each stage's base and check a reverse-percent answer forward, using lesson 4.
- A8: separate interest from final amount and simple from growing-balance rules.

After discussion, offer an analogous question rather than asking students to memorize this key. These prompts and feedback categories are not a validated assessment instrument; there is no established pass threshold.

Vocabulary

- **Principal:** the original amount used in the stated interest model.
- **Simple interest:** interest computed on the original principal for the stated time, rather than on accumulated interest.
- **Annual rate:** a rate per year; convert a percent to a decimal before using I = Prt.

Differentiation

- **Extra support:** provide one task per page, enlarged graphs or oral response options. Allow untimed work and a calculator after an expression is selected. Revisit the worked example before assessing simple interest separately.
- **Extra challenge, not required for assessment:** compare the worked example with annual compound growth at 3% for two years. **Guide:** 200 × 1.03 × 1.03 = 212.18,

compared with simple-interest total 212. The extra 0.18 is 3% of the first year's 6 interest. This illustrates a different assumption, not a full compound-interest course.

⚠ Safety

All money contexts are fictional. Do not request personal savings, borrowing, income or family circumstances. No purchases, account creation or financial recommendations are part of the activity.

Teacher notes

Separate “the interest is proportional to time” from “the total is proportional to time.” Keep rate periods and time units consistent: the displayed formula uses an annual rate with time in years. Classroom pacing and assessment use need local educator review. A second agent checking arithmetic does not make this a human-reviewed unit.

Previous lesson · Unit overview

Proposed K–12 Science Progression (Draft Framework)

Status: written framework (not lessons); unreviewed AI draft; CC0 1.0
Author: Claude Opus 5.5
Back to index: Repository home | Proposed K–12 framework

> **Important:** this maps a proposed sequence of science topics. A topic listed here is **not** a written unit unless it is marked **Unit written** with a link. It is not aligned to any official standard (NGSS, the English National Curriculum, or others). A teacher should check it against their own requirements before using it.

Principles

1. **Doing before naming.** Students handle, sort, measure and grow things before they learn the technical word. For example, they watch bread go mouldy before they hear "decomposer".
2. **Spiral, not one-and-done.** Big ideas (living things, matter, energy, forces, Earth and space) come back every band at a deeper level. Each return should build on the earlier one, not repeat it.
3. **Fair tests early, numbers gradually.** From grade 3, students change one thing and keep the rest the same. Measurement, tables and graphs grow alongside the maths progression in this repository.
4. **Safety is content.** Each unit teaches why a rule exists (sealed mould bags, never tasting, eye protection), not only the rule.
5. **Honest uncertainty.** Students learn to say what their evidence does and does not show, and that scientific models are simplifications.

Strands

Strand	Short name
Living things, ecosystems and the human body	Life
Materials, matter and chemical change	Matter
Energy, forces, light, sound and electricity	Physics
Earth, weather, climate and space	Earth & space
Working scientifically (questions, fair tests, data, argument)	Inquiry (runs through every unit)

Band 1: Grades K–2 (ages 5–8) — Noticing and sorting

- **Kindergarten:** Unit written: using our senses and watching the weather. Unit written: pushes and pulls. Unit written: what living things need, growing cress and a minibeast hunt. Living vs non-living (sorting cards and real objects); the five senses as observation tools; weather each day on a class chart; pushes and pulls with toy cars.

- **Grade 1:** Unit written: what do plants need?. Unit written: sound and light (vibrations make sound; seeing needs light; materials in a beam; a signal device). Unit written: patterns in the sky (the Sun's path and moving shadows; the Moon's patterns; stars at night; less daylight in winter). Plants need light and water (growing beans in a window vs a cupboard); animal body parts and what they do; day and night, shadows; materials that bend, stretch, float or sink.
- **Grade 2:** Unit written: solids, liquids and melting ice. Unit written: land and water, fast and slow (where water is found, a model and map of land and water, erosion by water and wind, fast and slow Earth changes, comparing ways to protect land). Unit written: habitats, seeds and helpers (counting kinds of living things in different habitats, a planned cress test changing light or water, model seeds that stick to fur, a model bee carrying pollen). Habitats and simple food chains; life cycles (butterfly or frog, from pictures or a class kit); solids and liquids, melting ice; sound comes from vibration (rubber bands, drums; first met in the grade 1 sound and light unit, so grade 2 can revisit it through pitch and loudness).

Band 2: Grades 3–5 (ages 8–11) — First fair tests

- **Grade 3:** Unit written: magnets. Unit written: weather over a season. Unit written: life cycles and traits. Plant parts and seed dispersal; rocks and soils (sorting, simple scratch tests); magnets and which materials they attract; first fair test with one changed variable.
- **Grade 4:** Unit written: electric circuits. Electric circuits with bulbs, buzzers and switches (conductors vs insulators); the water cycle and evaporation; teeth, digestion and healthy eating (no tasting experiments); fossils as evidence of past life.
- **Grade 5:** Unit written: dissolving and changes that cannot be undone. Earth, Sun and Moon (models of phases and seasons); reversible vs irreversible changes (dissolving vs burning, demonstrated by an adult); classification keys for animals; forces including friction and air resistance (paper spinners, ramps).

Band 3: Grades 6–8 (ages 11–14) — Systems and evidence

- **Grade 6:**
- **Fungi and decomposition — Unit written:** units/science/6-fungi-decomposition/. What fungi are, decomposers and the nutrient cycle, a sealed bread-mould fair test, a yeast balloon test with a control, and fungi in human life.
- Cells under a microscope (onion skin, cheek-cell images); particles model of solids, liquids and gases; light travelling in straight lines, reflection.
- **Grade 7:**
- **Photosynthesis and respiration — Unit written:** units/science/7-photosynthesis-respiration/. Van Helmont's willow and the iodine starch test, floating leaf discs in light and dark, a lamp-distance fair test with a line graph, bromothymol blue tubes showing respiration day and night, and a simple carbon cycle.
- Elements, compounds and mixtures (separating salt and sand); energy stores and transfers; the rock cycle and plate tectonics.
- **Grade 8:**
- **Acids, alkalis and indicators — Unit written:** units/science/8-acids-alkalis-indicators/. A red cabbage indicator for everyday liquids, the pH scale with universal indicator and litmus, neutralisation by counting drops (a repeated comparison with medians), and neutralisation in soils, antacids and the ocean.
- Genetics basics and variation; speed, distance and time graphs; weather vs climate and the evidence for a changing climate.

Band 4: Grades 9–12 (ages 14–18) — Models, quantities and choices

- **Grade 9:** Unit written: forces and Newton's laws. Biology: cell division, DNA and inheritance; chemistry: atomic structure and the periodic table; physics: forces and Newton's laws with measured data.
- **Grade 10:** Unit written: ecology field sampling. Ecology with field sampling (quadrats, population estimates); chemical reactions, conservation of mass and balancing equations; electricity (current, voltage, resistance) with real meters.
- **Grade 11:** Unit written: rates of reaction. Evolution by natural selection and the evidence for it; rates of reaction; waves, the electromagnetic spectrum and radiation safety.
- **Grade 12:** Unit written: the extended investigation (planning, uncertainty, reporting and peer review, practised on a pendulum). Choice pathways (for example biology, chemistry, physics, Earth science, or applied science), plus an extended independent investigation with a written report and peer review.

Connections to other subjects in this repository

- **Mathematics:** fair-test tables and line graphs in grade 6 use the ratio and rate ideas in the grade 6 ratios unit (for example, mould growth in squares per day).
- **Computing:** data logging and simple simulations can link to the computing progression.

Known gaps and open questions

- Twenty-one science units are written so far (kindergarten senses and weather, kindergarten pushes and pulls, kindergarten living things and their needs, grade 1 plants, grade 1 sound and light, grade 1 patterns in the sky, grade 2 solids and liquids, grade 2 land and water, grade 2 habitats, seeds and helpers, grade 3 magnets, grade 3 weather over a season, grade 3 life cycles and traits, grade 4 circuits, grade 5 dissolving and changes, grade 6 fungi, grade 7 photosynthesis and respiration, grade 8 acids and alkalis, grade 9 forces and Newton's laws, grade 10 ecology, grade 11 rates of reaction, grade 12 extended investigation), at least one per band. Everything else is a plan.
- Topic placement is a judgement call. Many systems teach circuits, cells or the Earth–Moon system in different years.
- Practical work assumes basic classroom equipment (hand lenses, sealed bags, balloons, simple circuits; a microscope from grade 6). Schools without these will need alternatives.
- No human educator has reviewed this progression. Its status will stay "written framework" until one does.

Contributions welcome: claim a grade or topic first, following CONTRIBUTING.md.

Kindergarten Science: Using Our Senses and Watching the Weather (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 6 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules. Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the science progression | Kindergarten year plan

Big idea

Scientists find things out by noticing carefully. We notice with our senses: looking, touching, listening and smelling (and tasting, but only food a grown-up gives us). If we notice the same thing every day and write it down, such as the weather, we can start to see patterns.

This is the first science unit of the kindergarten year (term 1). It starts a class weather chart that keeps going every day for the rest of the year; the term 3 science unit comes back to it.

Outcomes

By the end of the unit a student can:

1. Describe an object (a leaf, stone or shell) using at least two words about how it looks or feels (for example colour, size, shape, rough, smooth).
2. Say which sense they used: "I saw...", "I felt...", "I heard...", "I smelled...".
3. Follow the class rule: we only taste food a grown-up has given us to eat.
4. Describe today's weather with words such as sunny, cloudy, rainy, windy, warm and cool, and add a picture card to the class weather chart.
5. Count how many sunny (or cloudy, or rainy) days the chart shows so far, and say which kind of day we have had the most of.

Prior knowledge

- None needed beyond everyday talk. Counting to 10 helps in lesson 5 (it is being learned in mathematics at the same time; count together).
- No reading is needed; the weather chart uses picture cards.

Lessons

Lessons are short (20-25 minutes). Leave a day or two between lessons. From lesson 4 on, the weather chart takes about 2 minutes every day, at the same time each day (for example straight after the register).

Lesson	Title	Main activity
1	Looking closely	Describe leaves, stones and shells by how they look

Lesson	Title	Main activity
2	Feeling and listening	Feely bag and a listening walk
3	Smelling, and the tasting rule	Smell pots; why we never taste unknown things
4	What is the weather today?	Look outside and start the class weather chart
5	What has the weather been like?	Count the chart so far; end-of-unit check

Materials (whole class unless noted)

- A "nature tray" for each table: a few leaves of different shapes and colours, smooth and rough stones (none smaller than a ping-pong ball, so nothing can be swallowed), and a few clean shells of a similar size.
- Simple hand lenses (one per pair if possible).
- A cloth bag or box with a hand hole ("feely bag") and objects with clearly different textures: a pine cone, a smooth stone, a sponge, a feather, a wooden block, a piece of fabric.
- Three to five "smell pots": small lidded pots with holes in the lid, each holding something the school has approved (for example lemon peel, an orange slice, a mint leaf, a cinnamon stick, coffee grounds). Nothing sprayed or chemical.
- A large wall chart: one row per school day, with space for a picture card. Picture cards for sunny, cloudy, rainy, windy, snowy (if it snows where you live), foggy, and "warm" / "cool" cards. Lots of copies of each.
- A ribbon or paper streamer on a stick, or a windsock, to see the wind.
- Lesson 1: a large sheet and a marker for the class "describing words" list.
- Lesson 3: picture cards of what is in each smell pot (for matching); a picture of a tongue or a mouth; four tasting-rule cards (an apple on a plate, a berry on a bush, a mushroom on the grass, a bottle with no label).
- Lesson 4: three photos of different weather for the closing check (for example a sunny beach, a rainy street, a windy day with leaves blowing).
- Lesson 5: interlocking cubes in two or three colours; small base cards with the weather picture symbols (sun, cloud, raindrop) to stand each tower on; a five-day practice chart on a large sheet (3 sunny, 1 cloudy, 1 rainy, mixed order, drawn with the picture symbols); check cards (an eye, an ear, a hand, a nose; a rainy-day photo; the four tasting-rule cards).

Assessment

- Lessons 1-3: the teacher notes each child's describing words and "I saw / I felt / I heard / I smelled" sentences during table work (observe; no writing needed).
- Lesson 4 on: children take turns choosing the weather card; note who can explain their choice ("I chose cloudy because I can't see the sun").
- Lesson 5: a 5-question picture/talk check with an answer guide. Plan an extra small-group or one-to-one slot in the week to finish per-child checks; 20-25 minutes is not enough for the whole class.

⚠ Safety (read before lesson 1)

- Check the school's allergy list before lessons 1 and 3 (plants, nuts, shellfish, citrus, spices). Leave out anything a child in the class reacts to.
- Shells and stones: wash before use; check for sharp edges. Nothing small enough to swallow.

- Leaves: use only leaves the school knows are safe to handle. Wash hands after handling natural objects.
- Smell pots: children waft the smell towards their nose with a hand; they do not put their nose in the pot, and nothing comes out of the pot.
- No tasting in this unit. Lesson 3 teaches the tasting rule instead.
- Outside: stay in a supervised area; never look at the Sun, even quickly.

Access and taking part

- Every activity can be done with more than one sense: a child who cannot see well can describe by touch and sound; a child who cannot hear well can describe by looking and touch. Describing words can be spoken, signed, or chosen from picture cards.
- Feely bag, smell pots and closing eyes are all opt-in. A child can watch, use a picture choice, or describe an object that is in front of them.
- Children who find a busy listening walk hard can listen from a quiet spot or wear ear defenders and report what they saw instead.

Sources

- Next Generation Science Standards, kindergarten "Weather and Climate" topic page, K-ESS2-1: "Use and share observations of local weather conditions to describe patterns over time." The page's clarification statement gives sunny, cloudy, rainy and warm as examples of describing the weather, counting sunny, windy and rainy days in a month as examples of counting, and "usually cooler in the morning than in the afternoon" as an example of a pattern. Its assessment boundary limits counting to whole numbers and relative words like warmer/cooler. It also defines weather as "the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time." https://www.nextgenscience.org/topic-arrangement/kweather-and-climate
- Wikipedia, "Sense" (introduction): five senses (sight, smell, touch, taste and hearing) were traditionally named in some cultures, but many more are now recognised. https://en.wikipedia.org/wiki/Sense
- Wikipedia, "Weather" (introduction): weather is day-to-day conditions; climate is the average over longer periods. https://en.wikipedia.org/wiki/Weather

Known gaps

- The order of lessons and the choice of objects are mine, not from a source.
- "Five senses" is a simplification; the unit says "senses" and names the ones children use, and lesson 3's teacher note says there are more.
- Weather words depend on where you live. Add local words (for example drizzle, frost, monsoon, haze) and leave out snow if it never snows.
- One week of chart data shows very little. The pattern talk in lesson 5 is a start; the real pattern-spotting happens in term 3, after months of data.
- Peer check: Gemini 4 Argon did a bounded text, timing and answer-key check at d18fb8c (not an educator, safety or accessibility review). Its notes (missing materials; symbol labels and low-vision routes for the cube towers, photos and charts) were fixed in the follow-up commit e8f0b52 and e1d9472 (see PEERCHECKS.md), which Argon also diff-checked the same day.

Lesson 1: Looking closely

Goal: Children describe a leaf, stone or shell using at least two words about how it looks, and say "I saw...".

Length: about 20 minutes.

Materials

- A nature tray per table (leaves, stones, shells; see the unit materials).
- Hand lenses, one per pair if possible.
- A large sheet of paper for a class "describing words" list (the teacher writes; children draw a small picture next to each word if they like).

Steps

✎ Opening (5 min)

Hold up one leaf. "I am going to be a scientist. Scientists notice things very carefully." Model: "I see that it is green. I see that it has a pointy end. I see little lines on it." Ask: "What do you notice?" Take three or four answers and write the describing words on the class list (green, pointy, lines, big, small, shiny...).

✎ Main activity: notice and describe (10 min)

1. Each pair chooses one object from their tray.
2. They look at it with their eyes, then with the hand lens.
3. Each child tells their partner two things they notice, starting "I saw...".
4. Walk round and ask: "What colour is it? Is it bigger or smaller than your hand? What shape is it? What did you see with the lens that you didn't see before?"
5. Note each child's describing words (see assessment).

✓ Discussion questions (3 min)

- "Did the hand lens help? What did it show you?" (Answer guide: accept anything they actually saw, such as tiny lines on a leaf, sparkly bits in a stone, rings on a shell.)
- "Were all the leaves the same?" (Answer guide: no; they are different colours, shapes and sizes. Praise any child who compares two objects.)

✓ Closing check (2 min)

Hold up a stone. "Tell me one thing you see." Then a shell, then a leaf. Children answer together or show a thumbs-up when they have a word. (Answer guide: any true describing word: colour, size, shape, shiny/dull, spotty, stripy.)

Vocabulary

notice, describe, colour, shape, size, hand lens, scientist

Differentiation

- Support: offer a choice ("Is it big or small? Is it green or brown?").
- Stretch: describe the object so a partner can guess which one it is without seeing it.

⚠ Safety

- Check allergies before handing out leaves (see unit safety notes).
- Hand lenses are for looking at objects; never look at the Sun through one.
- Wash hands after the lesson.

Access

- A child who cannot see well can describe by touch; words can be spoken, signed or chosen from picture cards.

Teacher notes

- Timing: 5 + 10 + 3 + 2 = 20 minutes.
- Children may want to touch too; that is fine, and lesson 2 is about touch. Today, gently steer the words towards how things look.
- Keep the describing-words list on the wall; it grows over the unit.

Lesson 2: Feeling and listening

Goal: Children describe an object by how it feels, notice sounds around them, and say "I felt..." and "I heard...".

Length: about 25 minutes.

Materials

- The feely bag with 5-6 objects of different textures (pine cone, smooth stone, sponge, feather, wooden block, fabric).
- The nature trays from lesson 1.
- The class describing-words list.

Steps

✎ Opening (3 min)

"Last time we used our eyes. Today we use our hands and our ears." Show the class list and read two words from lesson 1 together.

✎ Main activity 1: the feely bag (10 min)

1. Sit in a circle. A child who wants a turn puts a hand in the bag (no looking) and feels one object.
2. They say one word about how it feels: rough, smooth, soft, hard, spiky, bumpy, squashy. The teacher adds new words to the class list.
3. Then they guess what it is and pull it out to check.
4. Give about six turns; others can feel objects from the nature trays and pass them round, saying "I felt..." to a neighbour.

✎ Main activity 2: listening walk (8 min)

1. Walk quietly around the classroom, the corridor or a safe outside area.
2. Stop three times. Everyone stands still and listens for about 20 seconds. Children who want to can close their eyes; others look at the floor.
3. After each stop, whisper to a partner one thing you heard.

✓ Discussion questions (2 min)

- "What did you hear on our walk?" (Answer guide: accept real sounds, such as footsteps, birds, a door, cars, wind, someone talking.)

- "Which did you use to find out the pine cone was spiky, your eyes or your hands?" (Answer guide: hands, by touch; some may say eyes too, since it looks spiky. Both are fine.)

✓ Closing check (2 min)

The teacher names a sense and children point to the body part they use: "Seeing" (eyes), "Hearing" (ears), "Touching" (hands or fingers; any skin is also right).

Vocabulary

feel, touch, rough, smooth, soft, hard, hear, listen, sound

Differentiation

- Support: offer two textures to compare side by side ("Which one is soft?").
- Stretch: sort the feely objects into soft and hard, or rough and smooth.

⚠ Safety

- Check the feely-bag objects for sharp edges and anything small enough to swallow.
- Listening walk: stay together in a supervised area.

Access

- The feely bag is opt-in; a child can choose an object they can see and describe how it feels.
- Closing eyes is opt-in.
- A child who cannot hear well can report what they saw or felt on the walk (for example the floor shaking from footsteps, a door moving).

Teacher notes

- Timing: 3 + 10 + 8 + 2 + 2 = 25 minutes.

Lesson 3: Smelling, and the tasting rule

Goal: Children describe smells and say "I smelled...", and know the class rule: we only taste food a grown-up has given us to eat.

Length: about 20 minutes.

Materials

- 3-5 smell pots (school-approved contents; see the unit materials and safety notes). Number the pots; keep a list of what is in each.
- Picture cards of what is in each pot (lemon, orange, mint, cinnamon, coffee), for matching.
- A picture of a tongue or a mouth, and picture cards of: an apple on a plate, a berry on a bush, a mushroom on the grass, a bottle with no label.

Steps

✎ Opening (3 min)

"We have used our eyes, hands and ears. What else can tell us about the world?" Point to your nose. "Our noses!" Show how to smell safely: hold the pot a little away and wave the air towards your nose with your other hand. Everyone practises the "waft" with an empty hand.

✎ Main activity: smell pots (8 min)

1. Pass one pot round the circle at a time. Children who want to waft and smell; anyone can pass.
2. Ask: "Do you like this smell? Is it strong or gentle? What does it remind you of?" Collect words (sweet, strong, fresh, like a cake, like my grandma's kitchen).
3. After each pot, children guess which picture card matches. Open the pot and show what is inside.

✎ Main activity: the tasting rule (5 min)

1. "We have one more sense in our mouths: tasting. But tasting is special, because some things can make us very ill."
2. Show the four picture cards one at a time. For each, ask: "Is it safe to taste?"
3. Teach the rule and say it together: **"We only taste food a grown-up has given us to eat."**

✓ Discussion question (2 min)

- "You find a berry in the park. It looks yummy. What do you do?" (Answer guide: don't taste it; show a grown-up. Praise any version of the rule.)

✓ Closing check (2 min)

Point to body parts and ask: "What does this sense do?" Eyes (see), ears (hear), hands (touch, feel), nose (smell), mouth/tongue (taste, only food a grown-up gives us).

Answer guide: the four tasting cards

- Apple on a plate: a grown-up gave it to us to eat, so yes.
- Berry on a bush: no; ask a grown-up first.
- Mushroom on the grass: no; never taste it. Show a grown-up.
- Bottle with no label: no; never taste or drink it. Tell a grown-up.

Vocabulary

smell, nose, waft, strong, gentle, taste, tongue, safe

Differentiation

- Support: offer two words to choose from ("Is it strong or gentle?").
- Stretch: match each smell pot to its picture card without help.

⚠ Safety

- Check allergies (citrus, spices, coffee, plants) before choosing pots.
- Waft only; noses do not go into the pot. Lids stay on; contents stay in.
- No tasting in this lesson.

Access

- Smelling is opt-in. Some children dislike strong smells or have a weak sense of smell; they can match the pictures, look at what is inside, or describe how the pot looks and feels.

Teacher notes

- Timing: 3 + 8 + 5 + 2 + 2 = 20 minutes.
- "Five senses" is a simple way to start. Scientists know there are more, such as sensing balance and knowing where your arms are with your eyes closed. If a child asks, say so.
- Link the tasting rule to your school's food and medicine rules.

Lesson 4: What is the weather today?

Goal: Children use their senses to describe today's weather, and start the class weather chart that will run all year.

Length: about 25 minutes (including going outside).

Materials

- Coats as needed; a ribbon or paper streamer on a stick, or a windsock.
- The class weather chart and picture cards (sunny, cloudy, rainy, windy, snowy, foggy, warm, cool). Use local words too.

Steps

✎ Opening (3 min)

"Weather is what the sky and the air are like outside right now. We can find out the weather with our senses!" Ask: "Which senses could help?" (Answer guide: eyes to see the sky and rain, skin to feel warm or cool and the wind, ears to hear rain or wind.)

✎ Main activity 1: weather detectives outside (10 min)

1. Go outside to a safe spot (or look out of a window if the weather is bad).
2. **Look:** "Is the sky blue or grey? Can you see clouds? Is anything wet?" Remind everyone: never look at the Sun.
3. **Feel:** "Is the air warm or cool on your face and hands? Can you feel wind?"
4. **Wind check:** hold up the streamer. "Is it hanging down, or moving?"
5. **Listen:** "Can you hear rain or wind?"

✎ Main activity 2: start the chart (8 min)

1. Back inside, show the chart and the picture cards. Name each one together.
2. Ask the class: "Which cards show today's weather?" Choose one sky card (sunny, cloudy, rainy, snowy or foggy), add "windy" if the streamer moved, and "warm" or "cool".
3. A child sticks the cards on today's row. Ask them to explain: "I chose cloudy because..."

✓ Closing check (4 min)

Show three photos of different weather (for example a sunny beach, a rainy street, a windy day with leaves blowing). For each: "What is the weather? How do you know?" (Answer guide: sunny: bright, blue sky, shadows; rainy: wet, umbrellas, puddles; windy: leaves or hair blowing. Accept any sensible clue from the picture.)

Every day from now on (about 2 minutes)

At the same time each day, one or two children check the weather (window or door is fine) and add cards to the chart, saying why. Keep the chart going for the whole year; term 3 science uses it.

Vocabulary

weather, sunny, cloudy, rainy, windy, warm, cool, sky, chart

Differentiation

- Support: offer two cards to choose from.
- Stretch: "Is it the same as yesterday? What changed?"

⚠ Safety

- Never look at the Sun, even quickly or through sunglasses.
- Dress for the weather; stay in a supervised area.

Access

- Children who cannot go outside can use the window, a door, or a photo taken that morning.
- Choosing a card, pointing or signing all count as describing.
- The weather picture cards carry symbols (sun, cloud, raindrop), not only colours. For the closing-check photos, a child with low vision can hear each photo described aloud ("leaves are flying, a girl's hair is blowing") or handle real clues (a damp cloth, sunglasses, a streamer) and say which weather it shows.

Teacher notes

- Timing: 3 + 10 + 8 + 4 = 25 minutes.
- Some days are two things at once (sunny and cloudy, or rain then sun). That is fine: let children add two cards, or choose what most of the sky looks like right now.
- Weather means right now in this place. If a child talks about weather on holiday, that is a good chance to say weather is different in different places.

Lesson 5: What has the weather been like?

Goal: Children count the kinds of weather on the class chart so far, say which kind we have had most, and show what they learned about the senses.

Length: about 25 minutes. Teach it after the chart has run for at least four or five school days.

Materials

- The class weather chart.
- Interlocking cubes in two or three colours (for example yellow for sunny, white for cloudy, blue for rainy), and a base card for each tower showing the weather symbol (sun, cloud, raindrop), so the towers can be told apart without colour.
- A practice chart drawn on a large sheet (see the closing check).
- Picture cards for the check: an eye, an ear, a hand, a nose; a rainy-day photo; the four tasting cards from lesson 3.

Steps

✎ Opening (3 min)

Do today's weather cards together, as every day. "Our chart is getting long! What has the weather been like?"

✎ Main activity: count our chart (10 min)

1. Point to each day in turn. For each sunny day, a child adds a yellow cube to a tower; cloudy, a white cube; rainy, a blue cube (use the kinds of weather you have actually had). Stand each tower on its symbol card and say the weather name aloud each time a cube goes on.
2. Count each tower together, touching each cube once.
3. Stand the towers side by side. "Which tower is tallest? So which kind of day have we had most?"
4. "Do you think next week will be the same?" Accept any guess; say we will keep watching and find out.

✓ Discussion questions (4 min)

- "Is it usually cooler in the morning or in the afternoon?" (Answer guide: usually cooler in the morning. Tell the class you will feel the air at the start of the day and after lunch for a few days and add a "warm" or "cool" card each time, so they can see for themselves. Some days it will not be true, for example if it rains in the afternoon.)
- "Why do scientists write things down every day?" (Answer guide: so they remember, and so they can see patterns, such as which weather happens most.)

✓ Closing check (8 min)

Five questions. Do them in small groups or one to one where possible; plan an extra slot in the week to finish (see the unit assessment notes).

1. Show a leaf. "Tell me two things you notice about it."
2. Show the eye, ear, hand and nose cards. "Which one do you use to smell?" Then "...to hear?"
3. Show the berry-on-a-bush card. "Can you taste it? What is our rule?"
4. Show the rainy-day photo. "What is the weather? How do you know?"
5. Show the practice chart: five days, with 3 sunny, 1 cloudy and 1 rainy (mixed order). "How many sunny days? Which weather did we have most?"

Answer guide: closing check

1. Any two true describing words (colour, size, shape, rough/smooth, shiny, spotty...). 1 mark.
2. Nose for smell; ear for hear. 1 mark for both.
3. No; we only taste food a grown-up has given us to eat (any version of the rule). 1 mark.
4. Rainy; any sensible clue, such as wet ground, puddles, umbrellas, drops. 1 mark.
5. 3 sunny days; sunny is the most. 1 mark.

This is a check of understanding (5 marks), not a test to pass. Note who needs more practice and revisit during the daily chart time.

Vocabulary

count, most, fewest, pattern, chart, usually

Differentiation

- Support: count the towers with the teacher's hand guiding; compare just two towers.
- Stretch: "How many more sunny days than rainy days?"

⚠ Safety

- None beyond the usual classroom rules.

Access

- Answers can be spoken, signed, pointed to or chosen from pictures.
- Cubes can be counted by touch. Each tower stands on a symbol card (sun, cloud, raindrop), so children with colour-vision differences do not have to rely on cube colour; name the tower aloud when pointing to it.
- For a child with low vision, describe the rainy-day photo aloud ("people are holding umbrellas, the street is shiny") or hand over real clues (a damp cloth, a small umbrella), then ask "What is the weather? How do you know?" Read the practice chart aloud day by day and let the child count the cubes by touch instead.

Teacher notes

- Timing: 3 + 10 + 4 + 8 = 25 minutes.
- With only a week or two of data, the "most" kind of weather tells us about those days, not about the whole year. Keep the chart going: term 3 science looks back at months of data.
- The cube towers are an early picture graph; mathematics this term counts and compares groups too, so the two subjects support each other.

Kindergarten Science: Pushes and Pulls (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 4 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules.

Back to the science progression

Big idea

Things only start moving, speed up, slow down, stop or change direction when something pushes or pulls them. With the same car on the same floor, a bigger push usually makes it go faster and farther. A slope gives a car a free push (the Earth pulls everything down), and rough ground slows a car down more than smooth ground does.

Outcomes

By the end of the unit a student can:

1. Show and name a push (away from you) and a pull (towards you), and sort everyday actions as push or pull.
2. Use a push or pull to make a toy car start, stop and change direction.
3. Predict, then test fairly (same car, same floor, same start line), whether a harder push makes a car go farther than a gentle push, and say what they saw.
4. Say that a car usually rolls farther down a higher ramp, and that a ball dropped from a hand always falls down.
5. Compare how far a car rolls on smooth and rough ground, and say which slowed it more.
6. Say "I think..." before trying, and "I saw..." afterwards.

Prior knowledge

- None needed beyond everyday play. Counting to 10 helps for measuring with cubes or footsteps.
- No reading is needed; recording is by stickers, drawings and class charts.

Lessons

Lessons are short (20-30 minutes) and mostly on the floor. Leave a day or two between lessons so children can play with the cars at free time.

Lesson	Title	Main activity
1	Push or pull?	Act out and sort everyday actions as push or pull
2	Start, stop, turn	Make a toy car start, stop and change direction
3	Gentle push, big push	Mark how far a car rolls after small and big pushes
4	Ramps	Roll a car down a low ramp and a high ramp
5	Smooth and bumpy	Roll a car onto smooth and rough surfaces; end-of-unit check

Materials (whole class unless noted)

- Toy cars that roll freely: one per pair, plus spares. Ideally all the same model, so results can be compared. No cars with small detachable parts.
- A large clear floor space (hall or cleared classroom), masking tape for a start line, sticky notes or beanbags as "stop markers".
- Interlocking cubes or a long paper strip for measuring distance; children can also count heel-to-toe footsteps.
- For ramps: a stiff board or a large hardback book about 60-80 cm long (or a length of plastic guttering), and a pile of large books or wooden blocks to raise it to "1 book" and "3 books" high.
- For surfaces: a piece of carpet or a rug, a towel, and a smooth floor or a large sheet of card; optionally bubble wrap or a doormat.
- A soft ball or beanbag; a door and a drawer in the classroom; a shopping bag or trolley-style toy on a string; a swing or picture of one.
- Push/pull picture cards (draw or photograph: opening a door, kicking a ball, pulling a wagon, pushing a pram, pulling a sock on, pushing a lift button, pulling a zip, pushing a swing). Two hoops or mats labelled with an arrow away (push) and an arrow towards (pull).

Assessment

- Lesson 1: sorting picture cards into push/pull hoops (observe and note).
- Lessons 3-5: each child's "I think" prediction (sticker on the class chart) and their "I saw" sentence, recorded by the teacher.
- Lesson 5: a 6-question picture/action check, 6 marks, with an answer guide (in lesson 5). It is a check of understanding, not a test to pass.

⚠ Safety (read before lesson 1)

- **Floor work:** clear the space of trip hazards; mark a "car zone" with tape so children are not walking where cars are rolling. Cars are rolled, never thrown.
- **Ramps:** keep ramps low (no higher than about 30 cm), on the floor, with the books or blocks underneath stable. Nobody stands or sits on a ramp.
- **Small parts:** check cars for loose wheels or small parts that could be a choking risk; remove damaged cars.
- **Pushing people:** we push and pull things, not each other. Paired "push/pull" movement games in lesson 1 use palms against a wall or pulling a rope/scarf gently together while sitting, never pushing a classmate.
- **Doors and drawers:** adult supervision when demonstrating; keep fingers away from hinges.
- Bubble wrap (optional) is supervised and collected afterwards; plastic is never put near faces.

Sources

All checked to load on 4 November 2026. These are teacher background; none are needed by the children.

- Wikipedia: Force (a push or a pull)

- Wikipedia: Motion
- Wikipedia: Newton's laws of motion (teacher background only)
- Wikipedia: Inertia (teacher background only)
- Wikipedia: Speed
- Wikipedia: Friction (why rough ground slows a car)
- Wikipedia: Rolling resistance (soft carpet slows rolling wheels)
- Wikipedia: Gravity (the Earth pulls things down)
- Wikipedia: Inclined plane (ramps)
- Wikipedia: Kinetic energy (teacher background only)
- Wikipedia: Toy vehicle

Known gaps and cautions

- **Labelled simplifications:** "force" is introduced only as an optional word for "a push or a pull". "Things slow down because the ground rubs on them" is the kindergarten version of friction and rolling resistance; the full idea (and that a moving object would keep going without them) comes in grades 3-5 and 6-8.
- Kindergarten comparisons are rough: a "big push" is not the same each time, so results vary. That is fine and worth talking about ("Was it a fair race?" leads into grade 3 fair tests).
- Magnets (a push or pull without touching) are left out on purpose: small magnets are a serious swallowing hazard for young children. A teacher-only demonstration with a large magnet could be added.
- No images yet; teachers will need to draw or photograph the picture cards.
- No standards alignment and no educator review.

Lesson 1: Push or pull?

Unit overview · Next: Lesson 2

Goal

Children feel and name a push (moving something away from you) and a pull (moving something towards you), and sort everyday actions into the two.

Materials

- A door and a drawer in the classroom; a toy on a string (or a small bag on a string); a soft ball.
- Push/pull picture cards (see the unit materials list), one set per group of 4, and two hoops or mats on the floor: one with an arrow pointing away (push), one with an arrow pointing towards a stick figure (pull).
- A long scarf or soft rope.

Steps

Opening (5 min). Sit in a circle. Roll the ball gently to a child and ask them to roll it back. "How did the ball start moving?" (I pushed it / I rolled it / my hand made it go.) "Could it start moving all by itself?" Collect ideas without correcting.

Main activity (15 min).

1. Demonstrate with the drawer: open it slowly. "My hand moved towards me. That is a **pull**." Close it: "My hand moved away from me. That is a **push**." Children copy with their hands in the air: pull (hands come towards chest), push (hands go out).
2. Actions game: call out actions and children mime them, then shout "push!" or "pull!": open a door, kick a ball, pull a wagon, push a swing, pull on a sock, press a button, pull up a zip, push a pram.
3. Children take turns to pull the toy on its string across the floor, and to push it back with one finger.
4. Scarf pull (sitting): two children sit facing each other, both holding the scarf, and take turns to pull it gently towards themselves. Then each child pushes their palms flat against a wall. "Which way did your hands go?"
5. In groups of 4, sort the picture cards into the push hoop and the pull hoop. Walk round and ask "How do you know?"

Discussion questions (with example answers).

- How can you tell a push from a pull? A push moves it away from me; a pull moves it towards me.
- Can you open a door with a push and with a pull? Yes, it depends which side you are on.
- What happens if nobody pushes or pulls the ball? It stays still.

Closing check (5 min, with answers). Show three cards one at a time; children show "push hands" or "pull hands": kicking a ball (push), pulling a wagon (pull), pressing a lift button (push).

Vocabulary

push, pull, move, away, towards; optional: force ("a push or a pull")

Differentiation

- Support: sort only 4 cards, with the teacher acting each one out first.
- Stretch: find a card that could be both (a swing: pull it back, then push it); find three pushes and three pulls in the classroom.

⚠ Safety

We push and pull things, not people. Scarf pulls are gentle and sitting down; no tug-of-war. Supervise door demonstrations and keep fingers away from hinges.

Teacher notes and misconceptions

- Some cards are honestly both (a swing, a zip that goes up and down); accept either answer with a good reason. Put "both" cards on the line between hoops.
- Children often think only people and animals can push or pull. Lesson 4 (the Earth pulls things down) and the wind blowing leaves are good later examples.
- Avoid saying "push is strong, pull is weak": either can be big or small.

Lesson 2: Start, stop, turn

Unit overview · Previous: Lesson 1 · Next: Lesson 3

Goal

Children use pushes and pulls to make a toy car start moving, stop, and change direction, and learn that a still car does not start on its own.

Materials

- One toy car per pair, plus spares; a clear floor space with a taped "car zone".
- Masking tape to make a simple road with one bend; two sticky notes per pair ("start" and "stop" spots).

Steps

Opening (5 min). Put a car on the floor and wait silently for 10 seconds. "Why isn't it moving?" (Nobody pushed it.) "What could we do?" A child gives it a push.

Main activity (15 min). In pairs on the floor:

1. **Start:** one child pushes the car gently to their partner.
2. **Stop:** the partner stops it with a flat hand. "What did your hand do?" (Pushed against it / blocked it.)
3. **Turn:** the car rolls past; the partner gives it a little push from the side so it changes direction. Try to make it go round a sticky note.
4. **Road challenge:** push the car along the taped road and round the bend, using as few pushes as possible. Count the pushes.
5. Swap roles and repeat.

Discussion questions (with example answers).

- What made the car start? A push from my hand.
- What made it stop? My hand pushed back; it bumped into the wall; it slowed down on its own (accept; lesson 5 explores this).
- How did you make it turn? I pushed it from the side.
- Can a car start moving all by itself on a flat floor? No, something has to push or pull it.

Closing check (5 min, with answers). "Show me with your car": make it start (a push), stop (a hand in the way), turn (a push from the side).

Vocabulary

start, stop, turn, direction, faster, slower

Differentiation

- Support: work with an adult; use a larger car and a wide road.

- Stretch: make the car go round two sticky notes in a zigzag; can you make it go backwards with a pull?

⚠ Safety

Cars stay in the taped car zone and are rolled, never thrown. Children sit or kneel; nobody walks through a "road" while cars are rolling.

Teacher notes and misconceptions

- Children may say the car stopped "because it got tired" or "ran out of push". Accept for now and come back to it in lesson 5 (the floor rubbing on it slows it down).
- Pushing from the side to change direction is harder than it looks; let children play.

Lesson 3: Gentle push, big push

Unit overview · Previous: Lesson 2 · Next: Lesson 4

Goal

Children predict whether a bigger push makes a toy car go faster and farther, test it fairly (same car, same floor, same start line), and practise measuring "how far" with cubes or footsteps.

Materials

- One toy car per group of 3 (the same model if possible); a taped start line.
- Sticky notes in two colours per group (e.g. yellow = gentle push, blue = big push) to mark where the car stops.
- Interlocking cubes or heel-to-toe footsteps for measuring.
- Class chart with two columns, "gentle push" and "big push", and a sticker per child for the prediction.

Steps

Opening (5 min). Show a car at the start line. "If I give it a tiny, gentle push, and then a big push, which time will it go farther?" Each child puts a sticker on the chart under their guess ("I think...").

Main activity (15-20 min). In groups of 3 (pusher, marker, measurer):

1. The pusher holds the car with its back wheels on the start line and gives a **gentle** push (one finger, a little tap). The marker puts a yellow sticky note where the car stops.
2. Back to the start line; a **big** push (whole hand, a firm shove, still staying on the floor). Blue sticky note where it stops.
3. The measurer counts footsteps (or lays cubes) from the start line to each sticky note.
4. Swap roles; each child does one gentle and one big push.
5. Back on the carpet, look at the sticky notes on the floor together. Where are most of the yellows? Most of the blues?

Discussion questions (with example answers).

- Which push made the car go farther? Usually the big push. If not, ask what was different (a swerve, a bump, a different spot on the floor).
- Which push made it go faster? Ask what they saw; usually the big push looks faster, but accept what they actually observed.
- Was your prediction right? Children say "I thought... I saw...".
- Did every big push go exactly the same distance? No, because people push differently each time, and some cars are wobbly. Is that a fair race?

Closing check (5 min, with answers). "I want the car to reach the bookshelf. Gentle push or big push?" (Big push.) "I want it to stop before the line, near me. Gentle or big?" (Gentle.)

Vocabulary

gentle, big (hard), far, farther, near, fast, faster, measure

Differentiation

- Support: measure with a long paper strip and a crayon mark instead of counting.
- Stretch: try a "medium" push and predict where it will stop before trying; count cubes and say how many more for the big push.

⚠ Safety

Big pushes stay on the floor; cars are never thrown or flicked into the air. Keep the area in front of the start line clear of people.

Teacher notes and misconceptions

- Results will be mostly, not always, as expected: a gentle push can travel far on a very smooth floor, and a big push can make a car swerve into a wall. Talk about this honestly instead of hiding the "wrong" result.
- Kindergarten version: "with the same car on the same floor, a bigger push usually makes it go faster, and a faster car goes farther before it stops." Kinetic energy and speed are teacher background only.

Lesson 4: Ramps

Unit overview · Previous: Lesson 3 · Next: Lesson 5

Goal

Children see that a car let go at the top of a slope starts moving without anyone pushing it, because the Earth pulls everything down, and that a higher ramp makes it roll farther.

Materials

- A stiff board, a large hardback book, or plastic guttering, about 60-80 cm long, on the floor.
- Large books or wooden blocks to raise one end: "1 book" high and "3 books" high (keep the top below about 30 cm).
- One toy car; sticky notes in two colours; cubes or footsteps for measuring.
- A soft ball or beanbag.
- Class chart with two columns, "low ramp" and "high ramp", and stickers.

Steps

Opening (5 min). Hold a beanbag up high and let go. "Did I push it down?" (No.) "Then why did it go down?" Collect ideas. Explain: "The Earth pulls everything down towards it, all the time. That is why things fall when you let go." Try letting go of the beanbag sideways: it still ends up on the floor.

Main activity (15-20 min). Whole class around one or two ramps, children taking turns:

1. Put the car at the top of the low ramp (1 book) and **let go** without pushing. "Why did it move?" (The Earth pulled it down the slope.) Mark where it stops with a yellow sticky note.
2. Predict: "If we make the ramp higher, will the car go farther, less far, or the same?" Stickers on the chart.
3. Raise the ramp to 3 books. Same car, same starting spot, let go without pushing. Mark with a blue sticky note.
4. Do each ramp height three times, with a different child letting go each time. Measure to each note with footsteps or cubes.
5. Look at where the yellow and blue notes are.

Discussion questions (with example answers).

- Did anyone push the car on the ramp? No; we just let go.
- What pulled it? The Earth pulled it down the slope.
- Which ramp made it go farther? The high ramp.
- Why did we let go instead of pushing? So every go was the same and we could compare only the ramp (a first taste of a fair test).

Closing check (5 min, with answers). "If I let go of a ball, which way will it go?" (Down.) "I want the car to roll as far as the door. Low ramp or high ramp?" (High ramp.)

Vocabulary

ramp, slope, high, low, let go, fall, down; optional: gravity ("the Earth's pull")

Differentiation

- Support: compare only the two ramp heights once each, with an adult measuring.
- Stretch: try 2 books and predict where the car will stop; try a different car and see if it behaves the same.

⚠ Safety

Ramps stay on the floor and low (below about 30 cm); books or blocks under them must be stable. Nobody stands or sits on a ramp. Children wait their turn outside the car zone.

Teacher notes and misconceptions

- A very steep ramp can make cars crash at the bottom and go less far; keep heights modest so the pattern is clear.
- Children often think heavy things are pulled down and light things are not (a balloon or feather "floats"). Air slows light things; it is fine to say "the air gets in the way of the feather" without more detail.
- "Gravity" is optional at this age; "the Earth pulls things down" is the idea that matters.

Lesson 5: Smooth and bumpy

Unit overview · Previous: Lesson 4

Goal

Children compare how far a car rolls on smooth and rough surfaces, notice that rough ground slows a car down more, and show what they have learned in a short picture/action check.

Materials

- The low ramp from lesson 4 (1 book high), so every run starts the same way.
- Three surfaces laid at the bottom of the ramp, one at a time: a smooth floor or a large sheet of card, a piece of carpet or a rug, and a towel. Optional fourth: bubble wrap or a doormat.
- One toy car; sticky notes; cubes or footsteps.
- Class chart with one column per surface and a picture of each.
- For the check: the push/pull picture cards, a car, a ramp, and a check sheet for the teacher (one line per child, 6 boxes to tick).

Steps

Opening (5 min). Children rub their hands on the carpet, then on the smooth floor or a table. "Which feels bumpy and rough? Which is smooth?" Predict with stickers: "On which one will the car roll farthest?"

Main activity (15 min).

1. Lay the smooth surface at the bottom of the ramp. Let the car go from the top (no push). Mark where it stops; measure.
2. Repeat with the carpet, then the towel, keeping the same car, the same ramp and the same starting spot.
3. Do each surface twice. Put a sticky note on the chart showing the distance (e.g. a strip of cubes taped to the chart).
4. Look at the chart. Which surface let the car go farthest? Which stopped it soonest?

Discussion questions (with example answers).

- Which surface let the car roll farthest? The smooth floor.
- Which slowed it down the most? The towel (or carpet): it is bumpy and soft, and it rubs on the wheels.
- Remember lesson 2: why did your car slow down and stop on its own? The floor rubs on it and slows it down.
- Where would you want a smooth floor? A rough floor? Smooth for a race track or a slide; rough for a path where you do not want to slip.

End-of-unit check (10 min, 6 marks). Do this in small groups or one to one while the class plays. Children answer by pointing, acting or saying. One mark each.

1. Show the card of a child pulling a wagon. "Push or pull?" **Answer:** pull.
2. Show the card of a foot kicking a ball. "Push or pull?" **Answer:** push.

3. "Show me how to make this car stop." **Answer:** puts a hand (or object) in the way / pushes against it.
4. "I want this car to go a long way. Gentle push or big push?" **Answer:** big push.
5. Show the low and high ramp (or a picture). "Which will make the car roll farther?" **Answer:** the high ramp.
6. Show the smooth floor and the towel. "Which will slow the car down more?" **Answer:** the towel (the rough/bumpy one).

Record a tick for each answer; note any explanations a child gives ("because the Earth pulls it", "the towel rubs it"), which are worth more than the tick. This check shows what to revisit; it has no pass mark.

Vocabulary

smooth, rough, bumpy, slow down, rub; optional: friction ("rubbing that slows things down")

Differentiation

- Support: compare just two surfaces (smooth floor and towel).
- Stretch: predict where bubble wrap or a doormat would go on the chart before trying it; invent a "slowest track" from classroom materials.

⚠ Safety

Ramps stay low and on the floor. Towels and rugs lie flat so nobody trips. Bubble wrap (if used) is supervised, kept away from faces, and collected afterwards.

Teacher notes and misconceptions

- Soft surfaces like carpet slow wheels partly by squashing under them (rolling resistance) as well as rubbing (friction). "The rough floor rubs and squashes, which slows the car" is enough at this age.
- Many children (and adults) think a moving thing stops "because the push runs out". The better idea, for later grades, is that it would keep going if nothing slowed it; rubbing and squashing are what stop it. You can hint: "On the smoothest floor it went farthest. What if the floor were even smoother, like ice?"
- If results come out unexpected (a car swerves off the towel), repeat it and talk about why.

Kindergarten Science: What Living Things Need, Growing Cress and a Minibeast Hunt (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 6 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules.
>
> Text-checked by one other agent (GPT-6.1 Terra); see Known gaps.

Back to the science progression | Kindergarten year plan

Big idea

Plants and animals (including people) are living things, and they need some things to stay alive. All living things need water. Animals need food. Plants do not eat food the way animals do, but they need light. Animals usually live in places where they can find what they need.

This is the last science unit of the kindergarten year (term 3). It uses the looking and describing skills from term 1, and it ends by looking back at the class weather chart that has run since term 1.

Outcomes

By the end of the unit a student can:

1. Say that all living things need water, and that animals need food.
2. Say that plants need light, and describe what happened to the class cress kept in the dark (usually pale, yellow and floppy).
3. Help plant seeds and care for them, and say what we meant to change and what we tried to keep the same in our "light and dark" pots.
4. Find and describe small animals outdoors without hurting them, and say where they were found (for example under a log, in the grass).
5. Match an animal to a place where it can find what it needs, and give one reason ("The duck lives at the pond because it can swim and find food there").
6. Count the weather chart for a month and say which kind of weather happened most.

Prior knowledge

- Term 1 science: describing words, using the senses, the tasting rule, the daily weather chart.
- Term 2 mathematics: counting to 20 and comparing groups (helps in lesson 5).
- No reading is needed; everything uses pictures, real objects and talk.

Lessons

Lessons are 20-25 minutes. The cress needs time to grow, so spread the unit over about three weeks: teach lessons 1 and 2 in the first week, lesson 3 a few days later, lesson 4 about a week

after planting and lesson 5 about two weeks after planting. Children water the pots and check them for a minute or two on most days, next to the daily weather chart.

Lesson	Title	Main activity
1	Is it alive? What does it need?	Sort picture cards; what do a dog, a child and a plant need?
2	Planting cress: light and dark	Plant cress in pots; one pot goes in a dark cupboard
3	Minibeast hunt	Look for small animals outdoors, gently, and put everything back
4	Where do animals live?	Place animal cards on a picture map; check the cress
5	What did we find out?	Compare the cress pots; count the weather chart; end-of-unit check

Materials (whole class unless noted)

- Picture cards: a dog, a cat, a fish, a bird, a child, a tree, a flower, grass; plus non-living things such as a rock, a toy car, a spoon and a ball. Picture cards of water, food (a bowl of pet food, an apple), sunlight.
- Garden cress seeds (one packet is plenty), clean small pots or yoghurt pots with a hole poked in the base, cotton wool or kitchen paper, a tray, a small watering can or spray bottle, sticky labels.
- A cupboard or a large box that keeps out light.
- For the minibeast hunt: one magnifier per pair if possible, a few clear pots with air holes and lids for looking (teacher or adult handles these), a soft paintbrush for gently moving an animal into a pot, gloves for adults, and a picture sheet of animals you are likely to find locally (worms, woodlice, snails, spiders, ants, beetles).
- A large picture map (drawn or printed) with four places: a pond, a wood, a meadow (grass and flowers) and a garden or park. Animal picture cards to place on it: a duck, a frog, a fish, a deer, a squirrel, a woodlouse, a worm, a bee, a rabbit (change these to local animals).
- The class weather chart and coloured cubes (as in term 1, lesson 5), and a practice chart for the closing check (see lesson 5). Check cards: a log and a dry sunny path (plus cards already listed above).

Assessment

- Lessons 1-4: the teacher notes each child's answers to "What does it need?" and "Where did you find it?" during the activities (observe; no writing needed).
- Lesson 5: a 5-question picture/talk check with an answer guide. Plan an extra small-group or one-to-one slot in the week to finish per-child checks; 25 minutes is not enough for the whole class.

⚠ Safety (read before lesson 1)

- Check the school's allergy list before lessons 2-4 (plants, seeds, soil, insect stings). Leave out anything a child in the class reacts to.
- Cress is an edible plant, but this unit does not taste it. The term 1 rule holds: we only taste food a grown-up has given us to eat. Seeds and seedlings stay in their pots.
- Do not use dried beans for planting: some raw beans are harmful if eaten. Cress seeds are small, so the teacher shakes them onto the pots.

- Minibeast hunt: stay in a supervised area that an adult has checked first. Children look but do not pick up animals; an adult moves an animal into a viewing pot with a paintbrush if needed. Children do not touch spiders, bees, wasps, ants' nests, caterpillars with hairs, or anything that might sting or bite. Adults lift logs and stones, away from the children, and put them back the way they were.
- Everyone washes hands after handling soil, plants or anything from outside.
- Animal care: animals go back where they were found within a few minutes. Nothing is taken indoors to keep.

Access and taking part

- Every activity can be done by looking, touching (where safe) or listening. Answers can be spoken, signed, pointed to or chosen from picture cards.
- The minibeast hunt is opt-in: some children dislike or fear small animals. They can be the "recorder" who marks the picture sheet, or look at the viewing pot from a distance.
- Children who use wheelchairs or walking aids: choose hunt spots on paths or at a raised planter, or bring a tray of leaf litter to an outdoor table.
- Families keep different pets, or none, and some families do not keep animals for reasons of belief or health. Ask about animals in general, not about each child's home.

Sources

- Next Generation Science Standards, K-LS1-1: "Use observations to describe patterns of what plants and animals (including humans) need to survive." The clarification statement gives as examples "that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water." The page's core idea reads "All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow." https://www.nextgenscience.org/pe/k-ls1-1-molecules-organisms-structures-and-processes
- Next Generation Science Standards, K-ESS3-1: "Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live." The clarification statement's examples are "that deer eat buds and leaves, therefore, they usually live in forested areas; and, grasses need sunlight so they often grow in meadows." The page lists drawings, dioramas and dramatization among models at this age. https://www.nextgenscience.org/pe/k-ess3-1-earth-and-human-activity
- Wikipedia, "Etiolation" (introduction): plants grown with little or no light have "long, weak stems; smaller leaves" and "a pale yellow color". https://en.wikipedia.org/wiki/Etiolation
- Wikipedia, "Garden cress" (introduction): cress is "a fast-growing, edible herb". https://en.wikipedia.org/wiki/Garden_cress
- Wikipedia, "Woodlouse" (introduction): woodlice are often found in old wood, are not insects, and some roll up to protect themselves or to keep moisture in. https://en.wikipedia.org/wiki/Woodlouse

Known gaps

- The order of lessons, the choice of cress and the animals on the picture map are mine, not from a source.
- The light-and-dark cress pots aim to change one thing and keep the rest the same (a cupboard may also be warmer or cooler), and with only two pots the result is a class

observation, not a proof. Results vary; the lessons ask children to describe what they actually saw.

- "Plants do not eat food" is a kindergarten simplification: plants make their own food using light. Later grades (grade 7 photosynthesis) explain this.
- Which minibeasts you find depends on place and season. Teach lesson 3 in mild, damp weather if you can; if nothing turns up, use a tray of leaf litter on an outdoor table (tipped back afterwards) and the picture sheet.
- The light and dark pots are a simple comparison, not a full fair test (a cupboard can differ in warmth too), and one month of the weather chart says nothing about what the weather is always like.
- How fast cress sprouts and how dark-grown cress looks back in the light come from general growing experience, not from a source I read; the lessons ask children to report what they actually saw.
- Peer check: GPT-6.1 Terra did a bounded text check of the README and lessons 1-5 at a63f5e2 on 6 November 2026 (recorded in PEERCHECKS.md); fixes are in ee02851. Terra diff-checked a63f5e2 to ee02851 and asked for "intended" wording in lesson 2 and the outcomes; that follow-up is in commit 8bf7eea, which Terra also diff-checked. Not an educator, classroom, safety or standards review.

Lesson 1: Is it alive? What does it need?

Goal: Children sort pictures into living and not living, and say what living things need: all need water, animals need food, plants need light.

Length: about 20 minutes.

Materials

- Picture cards: dog, cat, fish, bird, child, tree, flower, grass; rock, toy car, spoon, ball.
- Picture cards of water, food (pet food, an apple) and sunlight.
- Two hoops or mats on the floor, labelled with a picture of a growing plant and a picture of a rock.
- A real potted plant, if the class has one.

Steps

✎ Opening (3 min)

Show the real plant (or a tree picture) and a toy car. "One of these is alive. Which one? How can you tell?" Accept ideas: it grows, it needs water, it was a seed once. Living things grow and need things to stay alive.

✎ Main activity: sort and ask "What does it need?" (10 min)

1. Hand out the picture cards. Children take turns putting a card in the "living" hoop or the "not living" hoop and saying why.
2. If a card is tricky (a toy car moves, but is it alive?), talk about it: it moves only when someone pushes it or a battery makes it go; it does not grow or eat or drink.
3. Hold up the dog card. "What does a dog need to stay alive?" Children place the water and food cards next to it. Do the same with the child card.
4. Hold up the tree card. "Does a tree eat a bowl of food?" (No.) "What does it need?" Place the water card and the sunlight card next to it.

✓ Discussion questions (4 min)

- "What do ALL the living things need?" (Answer guide: water.)
- "What do animals need that plants don't?" (Answer guide: food to eat. Plants need light instead.)
- "Do all animals eat the same food?" (Answer guide: no; for example a cat eats meat or cat food, a rabbit eats plants, a bird might eat seeds or worms.)

✓ Closing check (3 min)

Show a fish card and a rock card. "Which is alive? What does it need?" (Answer guide: the fish; water and food.) Then show a flower card. "What does a flower need?" (Answer guide: water and light.)

Vocabulary

alive, living, not living, need, water, food, light

Differentiation

- Support: sort only four cards (dog, tree, rock, spoon).
- Stretch: "Does a seed look alive? Is it?" (It is alive but resting; we will plant some next lesson and see.)

⚠ Safety

- None beyond the usual classroom rules.

Access

- Children can point to a hoop, push a card, sign or say their answer.
- Ask what animals in general need, not what each child's pet eats; not every family has pets.

Teacher notes

- Timing: 3 + 10 + 4 + 3 = 20 minutes.
- "Plants don't eat food" follows the standard's own example; plants make their own food using light, which comes much later (grade 7).
- Children often say that clouds, fire or the Sun are alive because they move or change. That is a normal idea at this age; ask "Does it eat or drink? Does it grow from a baby?" and leave it there.

Lesson 2: Planting cress: light and dark

Goal: Children plant cress, and set up two pots that we try to keep the same except for one thing we change on purpose: one gets light, one is kept in the dark.

Length: about 25 minutes.

Materials

- Garden cress seeds; small pots with a hole in the base; cotton wool or kitchen paper; a tray to stand the pots on; a small watering can or spray bottle; sticky labels.
- One pot per small group, plus two "class test" pots.
- A cupboard or a large box that keeps out light.
- The sunlight and water picture cards from lesson 1.

Steps

✎ Opening (3 min)

Show the sunlight and water cards. "Last time we said plants need water and light. Can we find out if that is true?" Show the cress seed packet and a few seeds on a dark plate. "These are tiny seeds. They are alive, but resting."

✎ Main activity: plant the cress (14 min)

1. Each group fills its pot with damp cotton wool (pressed down, not soaking). The teacher shakes a pinch of seeds onto each pot.
2. Groups put a name label on their pot and stand it on the tray by a window (not in strong direct sun that could dry it out).
3. The class test: the teacher prepares two more pots in front of the children, the same way: same cotton wool, same amount of water, the same pinch of seeds. Label one "light" (a sun picture) and one "dark" (a moon picture).
4. "What is the same about these two pots?" (Same seeds, same cotton wool, same water.) "We will change one thing on purpose." The "light" pot goes on the tray with the others. The "dark" pot goes in the cupboard or box.
5. "What do you think will happen to each pot?" Draw or write the class's guesses on a sheet next to the tray. Accept every guess.

✓ Discussion questions (4 min)

- "Why do the two class pots have the same seeds and the same water?" (Answer guide: so that light is the one thing we change on purpose. The cupboard might also be a little warmer or cooler, so afterwards we say what we saw, not that we have proved it.)

- "How will we keep them both watered the same?" (Answer guide: water them at the same time with the same amount; the dark pot comes out only for a quick check and goes straight back.)

✓ Closing check (4 min)

Hold up the two class pots. "Which one will get light? Which one will be in the dark? What is the one thing we are changing on purpose?" (Answer guide: the sun-label pot gets light; the moon-label pot is in the dark; we meant to change the light and keep everything else the same.)

Vocabulary

seed, plant, grow, light, dark, same, different, guess

Differentiation

- Support: one adult per group for pressing cotton wool and labelling.
- Stretch: "What else could we change in a test? What would we keep the same?" (For example water and no water; keep the light the same.)

⚠ Safety

- Check the allergy list before handling seeds. Wash hands after planting.
- Seeds stay in the pots; we do not taste cress or seeds (term 1 tasting rule).
- Do not use dried beans: some raw beans are harmful if eaten.

Access

- Children who do not want to touch damp cotton wool can label pots, hold the tray or choose where the pot goes.
- Guesses can be spoken, signed, drawn or shown by pointing to a picture of a tall plant or a small plant.

Teacher notes

- Timing: 3 + 14 + 4 + 4 = 25 minutes.
- Cress seeds usually start to sprout within a few days in a warm room, with or without light. The difference shows over the next week or so: cress in the dark usually grows pale or yellow, tall and floppy, while cress in the light is green. This is called etiolation. Do not tell the children beforehand; let them see it.
- This is a simple comparison with light as the intended change, not a full fair test: a cupboard can also differ in warmth or air, and two pots cannot show what all plants need. Report what the class actually saw.
- Water both class pots daily, at the same time and with the same amount. Keep checks of the dark pot short.

- Plant one or two spare pots in case a pot dries out or gets knocked over.

Lesson 3: Minibeast hunt

Goal: Children look carefully for small animals outdoors, describe them, say where they found them, and put everything back the way it was.

Length: about 25 minutes (including getting outside and back).

Materials

- One magnifier per pair if possible.
- A few clear viewing pots with air holes and lids, and a soft paintbrush (adults only).
- The picture sheet of likely minibeasts (worms, woodlice, snails, spiders, ants, beetles; change to suit your area), one per group, and a crayon.
- Gloves for adults.
- A shallow tray for leaf litter, in case nothing turns up: an adult fills it outdoors that day, children look at it on an outdoor table or bench, and the adult tips it back where it came from before the end of the lesson.

Before the lesson

An adult checks the hunt area that day: no broken glass, no wasps' or ants' nests, no plants that sting or are poisonous. Choose a few logs, stones or plant pots that adults can lift safely.

Steps

✎ Opening (3 min, indoors)

"Today we are scientists looking for small animals, called minibeasts. Our three rules: we look, we don't grab; we move slowly and quietly; we put everything back the way it was." Children say the rules back with actions (eyes, slow hands, putting a log back).

✎ Main activity: the hunt (15 min, outdoors)

1. In small groups with an adult, children look in the grass, on walls, on leaves and in leaf litter, using the magnifiers.
2. An adult lifts a log or stone slowly, away from the children, so they can look underneath. After a short look, the adult puts it back the way it was.
3. If children want a closer look, an adult moves the animal into a viewing pot with the paintbrush. Children look through the side, describe it ("It has lots of legs", "It is curled up"), then the adult puts it back where it was found.
4. Groups mark each kind of animal they see on the picture sheet, and draw a quick symbol for where: under a log, in the grass, on a leaf, on a wall.

✓ Discussion questions (4 min, back indoors after washing hands)

- "Where did we find animals? Which places had animals on our sheets?" (Answer guide: whatever the class found, using the "where" symbols. Often it is under logs and stones, where it is dark and damp. The sheet records kinds, not numbers, so do not ask which place had the most.)
- "Why do you think woodlice (or worms) live under logs?" (Answer guide: accept sensible ideas: it is damp there, it is dark and hidden, there are old leaves and wood to eat. Woodlice eat dead leaves and old wood, and they dry out easily.)

✓ Closing check (3 min)

Show the picture sheet. Each group says one animal they found and where they found it. (Answer guide: any true pairing from their sheet, such as "a worm, in the soil under a stone". If a group found none, "we found none, and we looked under the log" is a true answer.)

Vocabulary

minibeast, under, damp, dark, careful, find, describe

Differentiation

- Support: an adult points to one place at a time; children look and say "yes" or "no" for each animal on the picture sheet.
- Stretch: count how many legs (or count how many of one kind you found) and compare with another group.

⚠ Safety

- Stay in the checked area, in sight of an adult.
- Children do not pick up animals or touch spiders, bees, wasps, ants' nests or hairy caterpillars. Adults lift logs and stones away from the children and put them back gently.
- Everyone washes hands straight after the hunt.
- Check the allergy list for insect stings; a child with a sting allergy stays close to an adult who knows their plan.

Access

- The hunt is opt-in. A child who does not want to be near small animals can be the group's recorder, marking the sheet, or look at a viewing pot from a distance.
- Children using wheelchairs or walking aids: choose spots on paths, at a raised planter, or bring the leaf-litter tray to an outdoor table.
- Children who find being outside busy or noisy can use ear defenders or work at the leaf-litter tray at a quieter outdoor spot with an adult, or look at the picture sheet and photos of minibeasts indoors.

Teacher notes

- Timing: 3 + 15 + 4 + 3 = 25 minutes. Allow extra time for coats and handwashing if needed.
- If it is cold or dry and nothing turns up, use the leaf-litter tray outdoors and the picture sheet; the litter goes back where it came from. Say honestly that the animals may be hiding today; that is a true finding too.
- Woodlice are not insects, even though people often call them bugs. Children do not need this, but it is a fun fact if asked.

Lesson 4: Where do animals live?

Goal: Children use a picture map to show that animals live in places where they can find what they need, and they check the class cress.

Length: about 20 minutes. Teach it about a week after planting.

Materials

- The large picture map with a pond, a wood, a meadow and a garden or park.
- Animal picture cards: duck, frog, fish, deer, squirrel, woodlouse, worm, bee, rabbit (change to local animals).
- The class cress pots ("light" and "dark") and the guesses sheet from lesson 2.

Steps

✎ Opening (3 min): check the cress

Bring out both class pots. "What do you notice? Is anything growing? Is it the same in both pots?" Children describe what they see: colour, height, standing up or floppy. Record a quick drawing next to the guesses. Put the dark pot straight back.

✎ Main activity: animals on the map (10 min)

1. Show the picture map. Name each place together: pond, wood, meadow, garden.
2. Hold up the duck card. "Where does a duck find what it needs? What does it need?" (Water to swim in and food in the pond.) A child places it on the pond and says one reason.
3. Children take turns with the other cards, each giving one reason:
4. fish: pond (it lives in water).
5. deer: wood (it eats buds and leaves from trees and bushes).
6. squirrel: wood (nuts and seeds from trees; it climbs trees).
7. woodlouse: wood or garden, under a log (damp, old leaves and wood).
8. bee: meadow or garden (flowers).
9. frog: pond, or damp places near it.
10. rabbit, worm: meadow or garden (grass to eat; soil to burrow in).
11. Some animals fit more than one place. That is fine if the child gives a reason.

✓ Discussion questions (4 min)

- "Could a fish live in the meadow? Why not?" (Answer guide: no; it needs water all the time.)
- "Where would you find a lot of grass? Why does grass grow well there?" (Answer guide: in the meadow; it is open and sunny, and grass needs light.)

- "Where did we find woodlice on our hunt? Does that fit?" (Answer guide: usually under logs or stones; yes, it is damp and they eat old leaves and wood. If the class found none, say so.)

✓ Closing check (3 min)

Hold up the deer card and point to the pond and the wood. "Where would a deer live? Why?" (Answer guide: the wood; it eats leaves and buds there. Accept the meadow with a reason, for example "it eats grass".)

Vocabulary

live, pond, wood, meadow, garden, place, need

Differentiation

- Support: use only three animals and two places (duck/pond, deer/wood, bee/meadow).
- Stretch: "Where do people live? What do we need there?" (Homes, water, food from shops or farms.)

⚠ Safety

- None beyond the usual classroom rules.

Access

- Children can place cards with help, point, sign or say their answer.
- Use a large, clear map; for a child who cannot see well, give each place a different texture (blue fabric for the pond, sandpaper for the path, felt for the grass).

Teacher notes

- Timing: 3 + 10 + 4 + 3 = 20 minutes.
- The picture map is the "model" here: children use it to show which animals live where and why.
- Real animals do move between places; the aim is the reason, not one right answer.

Lesson 5: What did we find out?

Goal: Children compare the light and dark cress, count the weather chart, and show what they learned about what living things need.

Length: about 25 minutes. Teach it about two weeks after planting.

Materials

- The class cress pots ("light" and "dark") and the guesses sheet.
- The class weather chart and coloured cubes (yellow sunny, white cloudy, blue rainy; add colours for the kinds of weather you have had).
- A practice chart for the check, drawn on a large sheet in front of the children: ten days with 6 rainy, 3 sunny and 1 cloudy, in mixed order.
- Picture cards for the check: dog, tree, rock; water, food, sunlight; woodlouse; a log and a dry sunny path.

Steps

✎ Opening (3 min)

Do today's weather card together, as every day. Bring out both cress pots and stand them side by side.

✎ Main activity (10 min)

1. **Cress (5 min).** "What is different about the two pots?" Children describe colour, height, and whether the cress stands up. Look back at the guesses sheet. "Was our guess right?" Then: "Light was the thing we changed on purpose. What happened to our cress without light?" Say what the class actually saw. Add: "Scientists who have tested lots of plants found that plants need light to grow well. Our two pots are one small look at that."
2. **Weather chart (5 min).** Choose the last month of the chart. Children add a cube for each day to the tower for its weather, then count each tower together, touching each cube once. "Which kind of weather did we have most this month? Is it the same as the month we counted in term 1?"

✓ Discussion questions (4 min)

- "What would happen if we stopped watering the light pot?" (Answer guide: it would dry out, droop and die, because all living things need water. Do not do this to the class pots; it is a thought question.)
- "What did the weather chart show us about this month?" (Answer guide: which weather we had most this month, and whether it was the same as the month we counted in term 1. One month cannot tell us what the weather is always like.)

✓ Closing check (8 min)

Five questions. Do them in small groups or one to one where possible; plan an extra slot in the week to finish (see the unit assessment notes).

1. Show the two class cress pots (or a photo of them taken today). "Which pot was in the dark? How can you tell?"
2. Show the dog, tree and rock cards and the water card. "Which of these need water?"
3. Show the dog and tree cards and the food card. "Which one needs to eat food? What does the other one need instead?"
4. Show the woodlouse card, the log card and the sunny path card. "Where would we most likely find a woodlouse? Why?"
5. Show the practice chart. "How many rainy days? Which weather did we have most?"

Answer guide: closing check

1. The dark pot, with a clue from what the class actually saw (usually pale or yellow, tall, floppy). If both pots looked alike in your class, accept "neither looks different yet" and the child's description. 1 mark.
2. The dog and the tree (not the rock). 1 mark.
3. The dog eats food; the tree needs light (and water). 1 mark.
4. Under the log, with a reason: damp, dark, old wood or leaves to eat. 1 mark.
5. 6 rainy days; rainy is the most. 1 mark.

This is a check of understanding (5 marks), not a test to pass. Note who needs more practice.

Vocabulary

compare, different, same, most, need, grow

Differentiation

- Support: count the towers with the teacher's hand guiding; compare just two towers.
- Stretch: "How many more rainy days than sunny days?" on the practice chart (3 more).

⚠ Safety

- None beyond the usual classroom rules. The cress is not tasted.

Access

- Answers can be spoken, signed, pointed to or chosen from pictures.
- Cubes can be counted by touch. For a child who cannot see the cress, the teacher holds a strip of card beside each pot and snips it at the height of the cress; the child compares the two strips by touch. Children do not need to touch the cress itself.
- Colour-vision differences: name the pots by their sun and moon labels as well as by colour.

Teacher notes

- Timing: 3 + 10 + 4 + 8 = 25 minutes.
- After the lesson, put the dark pot in the light and keep watering it. Children can watch whether it turns greener over the next days.
- The weather chart has run since term 1. Grade 1 science can keep it going or start a new chart; the cube towers are an early bar graph.

Grade 1 Science: What Do Plants Need? (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 4 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules.

Back to the science progression

Big idea

A seed holds a tiny plant and a packed lunch. With water (and warmth) the seed wakes up and grows, using its packed lunch at first. To keep growing green and strong, the young plant needs light. Plants grow towards light.

Outcomes

By the end of the unit a student can:

1. Point to the baby plant (the shoot and root) and the food store inside a soaked bean seed.
2. Say what a seed needs to start growing (water) and what a young plant needs to grow green and strong (light and water).
3. Make a prediction ("I think...") and then say whether it was right, using what they saw.
4. Compare two plants using a measuring strip or cubes, and with words such as "taller", "shorter", "greener", "paler".
5. Describe a plant bending towards a window and say why.

Prior knowledge

- Kindergarten: living vs non-living; using senses to observe.
- Counting to 20; comparing "longer/shorter".
- No reading is needed; recording is by drawing, stickers and class charts.

Lessons

Lessons are short (25-40 minutes). Lessons 3 and 4 are separated by about a week of waiting while the beans grow; a 5-minute daily "plant check" fills the gap.

Lesson	Title	Main activity
1	What is inside a seed?	Open soaked beans and find the baby plant
2	Planting and predicting	Plant four pots: window/cupboard, watered/dry
3	Plant detectives	Daily checks; first roots and shoots in a bean jar
4	What happened?	Compare the four pots; pale tall cupboard plants
5	Plants reach for light	Turned pot on the windowsill; end-of-unit check

Timeline

- **Day 1:** soak beans overnight (teacher). **Day 2:** lesson 1.
- **Day 3:** lesson 2 (planting) and set up the bean jar for lesson 3.
- **Days 4-10:** 5-minute daily plant checks; lesson 3 on about day 6, when roots show in the jar.
- **About day 12-16:** lesson 4, when the window plants have two or more leaves. Lesson 5 setup can start the same day (turn one window pot).
- **About 3 days later:** lesson 5.

Bean germination time depends on warmth; in a cold classroom it can take two weeks. Plant a few spare pots in case some seeds do not grow.

Materials (whole class unless noted)

- Large bean seeds: dwarf French bean or runner bean seeds from a garden supplier, **untreated** (see Safety). About 40 seeds.
- A shallow dish for soaking; hand lenses (one per pair); paper towels.
- 6 identical small pots (or yoghurt pots with a drainage hole), saucers, peat-free compost, a small watering can or measuring cup.
- 1 clear jar or clear plastic cup, kitchen paper, for the "bean jar".
- A dark cupboard or a large cardboard box that closes.
- Measuring strips (paper strips) or interlocking cubes; class chart paper; stickers or crayons for recording.

Assessment

- Lesson 2: each child's prediction drawing (kept for lesson 4).
- Lesson 4: "Was my prediction right?" talk, recorded by the teacher.
- Lesson 5: an oral/picture check of 6 questions, 6 marks, with an answer guide (in lesson 5).

⚠ Safety (read before lesson 1)

- **Seeds are not food.** Many raw beans contain a natural toxin (phytohaemagglutinin) and can make people ill if eaten raw; red kidney beans have the most (see sources). Tell children "we never eat seeds from the science table", supervise, and count seeds out and back.
- Buy **untreated** seeds. Some garden seeds are coated with pesticide or fungicide (often brightly coloured); do not give those to children.
- Small seeds are a choking risk for young children; large beans are easier to supervise. Know your class's allergies (legume allergy) before handling.
- Wash hands after handling compost and seeds. Use peat-free, bagged compost, not garden soil; wipe up spills.
- Hand lenses: never look at the Sun through them.

Sources

All checked to load on 4 November 2026.

- Wikipedia: Seed

- Wikipedia: Germination
- Wikipedia: Cotyledon (the seed leaves that hold the food store in beans)
- Wikipedia: Radicle (the first root)
- Wikipedia: Root
- Wikipedia: Plant stem
- Wikipedia: Phaseolus vulgaris (common bean)
- Wikipedia: Phytohaemagglutinin (why raw beans are not eaten)
- Wikipedia: Seed treatment (coated seeds)
- Wikipedia: Photosynthesis (teacher background only)
- Wikipedia: Chlorophyll (teacher background only)
- Wikipedia: Etiolation (long, weak, pale stems in the dark)
- Wikipedia: Phototropism (growing towards light)

Known gaps and cautions

- **Labelled simplifications:** "packed lunch" for the food store in the cotyledons; "plants use light to make their food" without the word photosynthesis (that comes in grade 7). Bean seeds do not need light to start growing (some small seeds, such as lettuce, do); children often expect light is needed, which is a useful surprise.
- Four pots is a small, rough comparison, not a proper fair test (that idea is formalised in grade 3). The cupboard is also cooler or warmer than the window, which is a hidden difference worth mentioning to older children.
- Results vary: a seed may fail to grow for reasons nobody can see. Spare pots help; the lesson 4 notes say what to do.
- No images yet; teachers will need to draw or photograph the plants.
- No standards alignment and no educator review.

Lesson 1: What is inside a seed?

Unit overview · Next: Lesson 2

Goal

Children find the baby plant and its food store inside a soaked bean, and learn that a seed is alive but "asleep".

Materials

- Bean seeds soaked overnight in water (2 per pair, plus spares), and a few dry beans for comparison.
- Hand lenses, paper towels, a tray per pair.
- A large drawing of an opened bean on the board (draw it yourself in advance).

Steps

Opening (5 min). Hold up a dry bean. "Is this alive? How could we find out?" Collect ideas without correcting. Then hold up a soaked bean: "This one had a bath overnight. What changed?" (Bigger, softer, wrinkly skin.)

Main activity (20 min).

1. Each pair gets a dry bean and a soaked bean. Compare: size, feel, colour.
2. Show how to rub off the skin (seed coat) of the soaked bean with a thumb.
3. Gently open it along the line into two halves, like a book.
4. Look with the hand lens for the tiny plant tucked at one edge: a little pointed root and a curled pair of tiny leaves.
5. Children draw what they see in a box on a page: "My bean inside".

Discussion questions (with example answers).

- Why did the soaked bean get bigger? It drank / soaked up water.
- What do you think the tiny leaves and root will become? A bean plant.
- The two big fat halves take up most of the bean. What are they for? Children may guess. Then explain: they are the baby plant's packed lunch. It eats this food while it is still under the soil, before it has leaves.
- Is the seed alive? Yes; it is waiting, like it is asleep, until it gets water.

Closing check (5 min, with answers). Point to the board drawing and ask children to show with their finger: the skin (seed coat), the packed lunch (two big halves), the baby root, the baby leaves. Then: "What woke the seed up?" (Water.)

Vocabulary

seed, seed coat, root, shoot, food store ("packed lunch"), soak

Differentiation

- Support: open a bean together as a group; give a picture with labels to stick on.
- Stretch: compare a bean with a soaked pea or a sunflower seed (adult shells it). Is there a baby plant in that one too?

⚠ Safety

Seeds are not food: count beans out and back; wash hands afterwards. Hand lenses never pointed at the Sun.

Teacher notes and misconceptions

- The two halves are the **cotyledons** (seed leaves); in beans they hold the food store. You do not need to teach the word in grade 1.
- Children often think the seed is "dead" because it does not move. The lesson 3 bean jar shows it waking up.
- Keep a few soaked beans in a covered dish on damp paper: some will sprout within days, a nice preview.

Lesson 2: Planting and predicting

Unit overview · Previous: Lesson 1 · Next: Lesson 3

Goal

Children plant beans in four groups of pots and predict which will grow best: light or dark, watered or not watered.

Materials

- 4 pots of the same size (plus 2 spares), filled with the same compost.
- 8 beans (2 per pot), labels, a watering can or measuring cup.
- A sunny windowsill (not right against a radiator) and a dark cupboard or closed box nearby.
- A big class chart with four pictures: sun + watering can, sun + no water, dark + watering can, dark + no water.
- A prediction sheet per child: four pot outlines to draw in.

Steps

Opening (5 min). "Last time we saw that water wakes a seed up. What else might a plant need?" Collect ideas (light, water, soil, sun, food, love...). Say we will test two of them: light and water.

Main activity (20 min).

1. Children help push 2 beans into each pot, about the length of a finger joint deep, and cover them.
2. Label the pots: **A** window + water, **B** window + no water, **C** cupboard + water, **D** cupboard + no water.
3. Water pots A and C with the same amount (for example half a cup). Make a show of not watering B and D.
4. Ask: "What must be the same for all four pots?" (same seeds, same pots, same compost, same number of beans). Only the light and the water change.
5. Put A and B on the windowsill and C and D in the cupboard.
6. Children draw their prediction on their sheet: what will each pot look like in two weeks? Collect sheets for lesson 4.

Discussion questions (with example answers).

- Which pot do you think will grow best? Why? Usually A, "because it has sun and water". Accept any reason.
- Will the beans in the dark cupboard grow at all? Many children say no. Do not correct; this is the surprise in lesson 4.
- Why do we put two beans in each pot? In case one does not grow.

Closing check (5 min, with answers). "What is different about pot C and pot A?" (C is in the dark.) "What is different about pot A and pot B?" (B gets no water.)

Vocabulary

predict, prediction, light, dark, the same, different

Differentiation

- Support: children choose a sticker (happy plant / sad plant / no plant) for each pot instead of drawing.
- Stretch: "If we wanted to know only about light, which two pots should we look at?" (A and C.)

⚠ Safety

Wash hands after handling compost. Wipe up spilled compost and water to prevent slips.

Teacher notes and misconceptions

- From now on, water pots A and C a little every two or three days, the same amount each time. A child can water A; an adult waters C privately, without showing the class, so the lesson 4 reveal stays a surprise. Close the cupboard door again quickly.
- "Plants eat soil" is common. We do not tackle it head on in grade 1, but in lesson 4 you can say that plants make their own food using light.
- Also set up the lesson 3 bean jar today (see lesson 3).

Lesson 3: Plant detectives

Unit overview · Previous: Lesson 2 · Next: Lesson 4

Goal

Children watch a seed wake up in a clear "bean jar", see that the root comes first and grows down, and practise careful daily observation.

Materials

- **Bean jar** (set up on the day of lesson 2): a clear jar or clear plastic cup lined with folded kitchen paper, with 3 soaked beans pushed between the paper and the glass, about halfway up. Keep 2 cm of water in the bottom so the paper stays damp. Keep it in the classroom, out of direct hot sun.
- A "plant detective" diary: one page per day with a box to draw in.
- Paper measuring strips (lesson 4 uses them too).

Daily plant check (5 min, every day from lesson 2 to lesson 4)

1. One child checks the window pots (A and B) and the bean jar and reports: "nothing yet", "something poking up", "leaves!". Pots C and D stay closed in the cupboard until lesson 4; an adult waters C without showing the class.
2. The class adds a sticker or tick on the class chart.
3. Water pots A and C every two or three days, same amount (C by an adult, privately).

Steps (the lesson itself, about day 6, when roots show in the jar)

Opening (5 min). "Detectives look very carefully and write down what they see." Show the jar. "What has happened to our beans?"

Main activity (20 min).

1. Pass the jar round (or let small groups come up) with hand lenses.
2. Children draw the bean jar in their diary: where is the root, where is the shoot?
3. Ask: "Which came out first, the root or the shoot?" (Usually the root.)
4. Teacher turns one bean upside down in the jar (or notes that the beans were placed different ways up). Predict: which way will its root grow tomorrow? Check over the next days: roots turn to grow down, shoots up.
5. Peek at pots A and C (do not dig them up). Are shoots coming up yet?

Discussion questions (with example answers).

- Why might the root come first? To get water and hold the plant in place.
- Which way do roots grow? Which way do shoots grow? Roots down, shoots up, even if the seed is upside down.
- Have the beans in the dry pots (B and D) done anything? Usually nothing; without water the seed does not wake up.

Closing check (5 min, with answers). Show a quick drawing of a sprouting bean. "Point to the root. Point to the shoot. Which way does the root grow?" (Down.)

Vocabulary

root, shoot, sprout, observe, diary

Differentiation

- Support: diary with ready-drawn jar outline; children add the root and shoot.
- Stretch: measure the longest root with a paper strip each day and stick the strips in a row to make a simple bar chart.

⚠ Safety

Wash hands after handling the jar. Mould can grow on very wet paper; if the jar smells or looks fuzzy, replace the paper and beans (adult only) and talk about why (see the grade 6 fungi unit for older students).

Teacher notes and misconceptions

- The first root is called the **radicle**; no need for the word in grade 1.
- If nothing has sprouted after 10 days, the room may be too cold. Move the jar somewhere warmer (not on a radiator).
- Keep the bean jar going: after a week the shoot gets green leaves in the light, which links to lesson 4.

Lesson 4: What happened?

Unit overview · Previous: Lesson 3 · Next: Lesson 5

Goal

Children compare the four pots, use measuring strips and colour words, and check their predictions. They learn that a seed needs water to start growing and a young plant needs light to grow green and strong.

Materials

- Pots A-D (bring C and D out of the cupboard only for this lesson).
- Children's prediction sheets from lesson 2.
- Paper measuring strips or interlocking cubes.
- A green crayon and a pale yellow crayon per group, for recording colour.

Steps

Opening (5 min). Before bringing out the cupboard pots, ask: "What do you think we will find in the cupboard?" Then reveal C and D.

Main activity (20 min).

1. Line up the pots A, B, C, D. Typical results:
2. **A (light + water):** short, sturdy stem; green leaves.
3. **B (light, no water):** nothing, or a dry seed.
4. **C (dark + water):** usually **taller** than A, with a thin floppy stem, tiny leaves and a pale yellow or white colour.
5. **D (dark, no water):** nothing.
6. Groups measure the tallest plant in each pot with a paper strip (hold the strip at the soil, tear or mark it at the top) and stick the strips on the class chart in order. Or count cubes.
7. Groups colour a square for each plant: green or pale yellow.
8. Children look at their prediction sheet: "Was I right? What surprised me?" The teacher writes a few sentences children say on the chart.

Discussion questions (with example answers).

- Why did nothing grow in B and D? No water, so the seeds never woke up.
- Pot C grew in the dark. How could it, without light? It used its packed lunch (the food store from lesson 1).
- Pot C is the tallest. Is it the healthiest? No: it is pale, floppy and has tiny leaves. It was stretching to find light.
- Why is A green? Plants turn green in the light; they use light to make their own food.

Closing check (5 min, with answers).

- "What does a seed need to start growing?" (Water.)
- "What does a young plant need to grow green and strong?" (Light and water.)
- "If we leave pot C in the dark for another month, what will happen?" (It will run out of packed lunch and die; or, if we move it to the window, it may turn green.)

Vocabulary

compare, taller, shorter, green, pale, healthy, surprise

Differentiation

- Support: compare only A and C side by side ("Which is taller? Which is greener?").
- Stretch: move pot C to the window and predict what will change in three days (it usually starts turning green).

⚠ Safety

Wash hands after touching plants and compost.

Teacher notes and misconceptions

- The tall, pale, weak growth in the dark is called **etiolation** (see sources). It surprises many adults too.
- "Tallest = best" is a common idea. Use this lesson to show that a bigger number is not always the better result.
- If a pot failed for no clear reason, say so honestly: "Sometimes a seed does not grow and we do not know why. That is why scientists use more than one seed." Use the spare pots if needed.
- The cupboard can be a different temperature from the windowsill. Grade 1 does not need this, but it is the first hint of a hidden difference, which returns in grade 3 fair tests.
- Turn **one** window pot (A or a spare) now for lesson 5: note which side faces the window, and do not turn it again.
- Optional, for lesson 5: set up the shoebox now. Cut a hole about 3 cm across in one short end, stand the box on its side with the hole facing the window, and put a watered, sprouted bean pot (a spare from lesson 2) inside at the far end. Close the lid. Check daily and close it again straight away.

Lesson 5: Plants reach for light

Unit overview · Previous: Lesson 4

Goal

Children see that bean shoots bend towards the light, explain it in their own words, and show what they have learned in a short picture check.

Materials

- The window pot that was turned at the end of lesson 4 (not turned since). After 2-3 days its shoots lean towards the window.
- Optional: a shoebox with a hole cut in one end, standing on its side with a watered, sprouted bean pot inside (set up at lesson 4; check daily, keep the lid closed between checks).
- End-of-unit picture check (below), one per child or done orally.

Steps

Opening (5 min). Show the leaning pot. "Our plants are leaning. Which way? Why might that be?" Collect ideas.

Main activity (15 min).

1. Ask a child to point where the window is. The shoots lean towards it.
2. Now turn the pot half way round so the shoots lean **away** from the window. Predict: what will they do in the next two days? Draw a prediction.
3. Check over the next two days (in daily plant checks): the tips bend back towards the window.
4. If you set up the shoebox: open it and look. The shoot has grown towards the hole, even round a corner if you added a card wall inside.

Discussion questions (with example answers).

- Why do the plants lean to the window? To get more light; they need light to grow green and strong.
- Remember pot C in the dark. How is that like the shoebox plant? Both stretch to find light.
- Do roots lean to the light too? No, roots grow down into the soil.

Closing: end-of-unit check (15 min). Teacher reads each question aloud; children circle a picture, point, or answer in a word. 1 mark each, 6 marks.

1. Show a drawing of an opened bean. "Point to the baby plant." (Either the tiny root or the tiny leaves at the edge, 1 mark.)
2. "What does a seed need to wake up and start growing: water, a toy, or music?" (Water.)
3. Show two plants: one short and green, one tall and pale. "Which one grew in the dark?" (The tall pale one.)
4. "Which one is healthier?" (The short green one.)
5. Show a pot on a windowsill. "Draw an arrow: which way will the shoots lean?" (Towards the window.)

6. "Finish the sentence: a young plant needs ___ and ___ to grow strong." (Light and water, both needed for the mark; accept "sun" for light.)

Answer guide notes. Accept "sunshine" for light. For question 6, children who add "soil" or "air" are not wrong; give the mark if light and water are both there. Record any child who says the tallest plant is the healthiest; revisit with pots A and C.

Vocabulary

lean, bend, towards, away from, light

Differentiation

- Support: questions asked one to one, answered by pointing.
- Stretch: "Design a maze for a bean plant." Draw a box with walls inside and a hole; predict the path the shoot will take. Build it if time allows.

⚠ Safety

Wash hands after handling plants. If children take plants home, send a note that the seeds and plants are not for eating.

Teacher notes and misconceptions

- Growing towards light is **phototropism**. The shaded side of the stem grows longer, so the stem bends (see the Phototropism source); grade 1 only needs "plants lean towards light".
- Children may say the plant "wants" or "likes" light. That is fine as a way of speaking at this age; later units ask how a plant can respond without a brain.
- After the unit, the bean plants can go outside or home. They will flower and may make pods; raw beans from them are still not for eating.

Grade 1 Science: Sound and Light (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 9 November 2026. No educator has reviewed or classroom-tested this unit. It draws on NGSS (see Sources) but is not formally aligned to any official standard. Check every safety note against your school's rules.
>
> Text-checked by two other agents (Gemini 4 Argon, Claude Fable 5.2); see Known gaps.

Back to the science progression | Grade 1 year plan - Term 1

Big idea

Sounds are made when something shakes back and forth very quickly (vibrates), and sound can make other things vibrate. We can see things only when there is light: either light shines on them, or they give off their own light. Some materials let light through, some let a little through, some block it and make a shadow, and shiny things such as mirrors bounce it. People use sound and light to send messages to someone far away.

This is the first science unit of grade 1 (term 1). It builds on the kindergarten senses unit (listening, looking, describing words) and on kindergarten pushes and pulls (a pluck or a tap is a small push).

Outcomes

By the end of the unit most children can:

1. Show that something vibrating makes a sound (a plucked rubber band, a tapped drum, a hand on the throat while humming), and that the sound stops when the vibrating stops.
2. Show that sound can make something else vibrate (rice jumping on a covered bowl near a loud tap on a tray), and say what they saw.
3. Say that we can see things only when there is light, using what they saw in a peep box: with the lid shut, nothing inside can be seen; with a torch on, it can. Tell a light source (a torch, a glow stick) from a shiny thing that only bounces light (foil, a mirror).
4. Test objects in a torch beam and sort them into "lets light through", "lets some light through", "blocks light (makes a dark shadow)" and "bounces light (shiny)", and say what they did to find out.
5. Design, build, test and improve a way to send a simple message across the room or playground using sound or light (a cup telephone, a drum-beat code or a torch-flash code), and say what worked and what they changed.

Prior knowledge

- Kindergarten science: the five senses, describing words, pushes and pulls.
- Kindergarten maths: counting to 20 (counting drum beats and flashes).
- Grade 1 maths term 1 runs alongside; no reading is needed. Sorting tables use pictures and real objects.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week. Lesson 5 can take two sessions if children want a second round of improving their design.

Lesson	Title	Main activity
1	Shake, rattle, hum: what makes a sound?	Rubber bands on a box, a ruler over a table edge, a hand on the throat
2	Can sound make things move?	Rice on a covered bowl near a tapped tray; feeling a drum; quiet and loud
3	Can we see in the dark?	Peep boxes with the lid shut and with a torch; light sources and shiny things
4	Through, some, blocked or bounced	Test materials in a torch beam and sort them on a table
5	Sending a message across the room	Design, build, test and improve a sound or light signal

Materials (whole class unless noted)

- **Lesson 1, per group of 3-4:** an open shoebox or plastic tub, three rubber bands of different widths (fitted by an adult), a plastic 30 cm ruler. Whole class: a drum or tambourine, a cardboard tube (for children who do not use their voice), and "shaking" and "still" picture cards for the closing check.
- **Lesson 2, per group:** a plastic bowl with cling film stretched tight over the top and held with a rubber band, a pinch of uncooked rice (about a teaspoon), a metal baking tray and a wooden spoon. Whole class: a drum, and if you have one a tuning fork and a bowl of water. Optional: a speaker playing music at a classroom volume, with a sheet of paper. A brush and dustpan for the rice. A blown-up balloon for feeling vibrations (see Access). Picture cards for the closing check (rice jumping beside a tapped tray; still rice, no tapping).
- **Lesson 3:** one peep box per group: a shoebox with the lid taped on, all gaps covered, one small hole (about 1 cm) cut in one end to look through and a flap (taped on one side) cut in the lid at the far end, above the toy, that can open to let light in. Inside each box, a small bright toy or picture stuck to the far wall. One small torch (LED, battery compartment screwed shut) per group. A glow stick or glow-in-the-dark star (charged in light beforehand), a piece of kitchen foil and a plastic safety mirror per group. Picture cards: Sun, candle flame, lamp, torch, Moon, mirror, spoon, foil, and two sorting mats ("makes its own light", "does not make its own light"). Optional: a phone camera to photograph the inside of a box for children who cannot look through the hole.
- **Lesson 4, per group:** a torch, a white card or wall to shine onto, and a tray of test objects: a clear plastic cup or sheet, a clear plastic bag cut open into a flat sheet, baking paper (or wax paper), tissue paper, a piece of cardboard, a wooden block, a sheet of kitchen foil, a plastic safety mirror, a piece of cloth. A large sorting table (four columns with picture headings: an open door for "through", a half-open door for "some through", a closed door for "blocked", a bouncing ball for "bounced") and picture cards of each object (two each for the foil and the mirror), plus a small sorting sheet with the same columns per group. For the closing check: a plastic sandwich box, a paper plate and a metal spoon.
- **Lesson 5, per group:** two paper or plastic cups with a small hole in the base, about 5 m of string, two paper clips (or pieces of craft stick) to tie off the string inside the cups; a drum or a tray and spoon; a torch; a message card set (pictures: "come here", "stop",

"wave", "sit down"). A "test and change" sheet with three picture rows (try it, what happened, what we changed); two small blank code cards. A large space (hall, playground or a cleared classroom).
- Whiteboards and pens, or paper and pencils, for drawing in every lesson.
- Ear defenders for any child who wants them (lessons 1, 2 and 5).

Assessment

- Lessons 1-4: the teacher notes answers in the closing checks (observe; no writing needed). Children can answer by speaking, signing, pointing or choosing a picture card.
- Lesson 5: the test-and-change sheet (drawings or picture stickers) and a short talk: "What did you try? What happened? What did you change?"
- End-of-unit one-to-one check (about 5 minutes per child; plan extra small-group time in the week, as 40 minutes is not enough for a whole class). Answer guide:
    1. "Pluck this rubber band. What is it doing when it makes a sound?" (It is shaking / vibrating; when it stops, the sound stops.)
    2. Picture of rice jumping on a covered bowl beside a tray being tapped. "Why is the rice jumping?" (The sound from the tray makes the cover shake.)
    3. "In a box with no light at all, could you see the toy?" (No; we need light to see.)
    4. Hold up baking paper, cardboard and a clear plastic sheet. "Which lets light through? Which lets some through? Which blocks it?" (Clear plastic; baking paper; cardboard.)
    5. "Is a mirror a light source like a torch?" (No; it bounces light, it does not make its own.)

⚠ Safety (read before lesson 1)

- **Never look at the Sun**, even with sunglasses or through coloured film. Say this in lessons 3 and 4.
- **Never shine a torch into anyone's eyes**, including your own. Shine torches at the wall, card or floor. Use small LED torches with screwed battery covers; no laser pointers at all. In the peep box (lesson 3) the torch points down onto the toy, away from the peephole; in the codes (lesson 5) it points at a wall or card beside the receiver.
- Keep sounds at a comfortable level. Agree a "hands up, everything stops" signal before any noisy activity. Some children find loud or sudden sounds painful: offer ear defenders, a quieter corner or the role of "watcher" or "recorder" instead.
- Rubber bands: an adult fits them round the box before lesson 1; children pluck them and look from the side. Bands stay over the box, never at people or faces. Check the school's latex allergy list; use latex-free bands if needed.
- Rulers stay flat on the table and are pushed down with one hand; no flicking towards others.
- Rice stays on the covered bowl and is swept up afterwards; nobody puts rice in mouths, noses or ears. Leave rice out for any group with a child who might, and use a small pom-pom or paper confetti instead.
- Balloon (lesson 2 Access): an adult blows it up and ties it; burst pieces are picked up and binned at once (a choking risk).
- The clear plastic bag in lesson 4 is cut open into a flat sheet; nothing goes over heads or faces.
- Mirrors are plastic safety mirrors only. Foil edges can be sharp: fold them over.
- Cup telephones: string is never wrapped round fingers, wrists or necks, and pairs walk (not run) to stretch it. Watch that strings do not cross walkways where others could trip.

- Glow sticks stay closed; do not bend them hard or bite them. A glow-in-the-dark star (charged under a lamp) is a safer choice.
- Darkened rooms: never fully dark; keep a door light or a lamp on and an adult near the light switch. Use peep boxes rather than a dark room.

Access and taking part

- Deaf and hard-of-hearing children can feel vibrations directly: a hand flat on the drum, on the box with the rubber bands, on a balloon held near a speaker, or on the cup telephone string. Feeling the vibration is a full way to show outcomes 1 and 2. In lesson 5 a light or touch signal (a tug on the string) is as good as a sound signal.
- Blind and low-vision children can show outcome 1 and 2 by touch and sound, and can take part in lessons 3-4 by holding objects in the beam while a partner describes the shadow (warmth is not a clue: an LED torch stays cool). They can be the "sound team" in lesson 5. A talking or tactile sorting table (objects stuck to the columns, columns marked with different textures) helps in lesson 4.
- Children who find the dark frightening never need to be in a dark space: the peep box keeps the dark inside a box.
- Answers can be spoken, signed, pointed to, chosen from picture cards or drawn. Sorting columns use pictures and shapes, never colour alone.
- Children with limited hand movement can tap a drum with a whole hand, press a torch with a big button (or a partner holds the torch and they say "now"), or hold a cup while a partner manages the string.

Sources

- Next Generation Science Standards, topic "1. Waves: Light and Sound" (performance expectations 1-PS4-1 to 1-PS4-4), read 9 November 2026: https://www.nextgenscience.org/topic-arrangement/1waves-light-and-sound
  - 1-PS4-1: "Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate." Its examples include "tuning forks and plucking a stretched string" and "holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork."
  - 1-PS4-2: "Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated." Its examples include "a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight", and it notes that illumination "could be from an external light source or by an object giving off its own light."
  - 1-PS4-3: investigate "the effect of placing objects made with different materials in the path of a beam of light", with examples "transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror)". The assessment boundary leaves out the speed of light.
  - 1-PS4-4: "Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance." Its examples include "a light source to send signals, paper cup and string" telephones, and a pattern of drum beats.
  - Core idea PS4.B on the same page: "Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam."

Known gaps and cautions

- The words "transparent", "translucent", "opaque" and "reflective" come from the standard's examples. This unit uses everyday words first ("through", "some through", "blocked", "bounced") and offers the science words as extra; teachers can choose.
- Some objects do not fit one column neatly: a clear plastic sheet that is crumpled lets some light through, foil both blocks and bounces light, and a mirror blocks light behind it. Lesson 4 treats these as things to talk about, not as errors.
- "Sound makes the rice jump" is shown, not proved: the tray is not touching the bowl, but a table that wobbles can also shake it. Lesson 2 asks children to hold the tray off the table to rule that out, and to say what they saw.
- How well a cup telephone works depends on tight string, cups and distance; results vary. Children report what happened rather than a "right" answer.
- How sound travels through air (as a wave) and how the ear works are left for later grades.
- Peer check: Gemini 4 Argon did a bounded text, timing, safety, access and answer-guide check at 5a9a7eb (not an educator, classroom or safety review). Timings and answer guides were correct. Its notes (missing lesson navigation links; lesson materials lists missing items used in steps, access notes and closing checks; clearer wording for the cardboard tube) were fixed in the follow-up commit 156d7fa (see PEERCHECKS.md), which Argon also diff-checked the same day.
- Peer check: Claude Fable 5.2 did a text check at fda4488 for pitch, safety and misreadable claims (not an educator, classroom or safety review; it tried none of the activities). All 13 NGSS quotes, the timings and the links were correct. Its notes were fixed in the follow-up commit (see PEERCHECKS.md): the peep-box torch now points down onto the toy, away from the peephole; the glow star comes out before the foil and mirror; torch codes aim at a wall beside the receiver; adults fit the rubber bands and tie the balloon; the bag is cut flat; craft sticks replace matchsticks; the narrow/wide band step no longer promises a higher sound (width can roughly cancel out), and the ruler models pitch instead; groups tap one at a time; the lesson 2 closing question no longer suggests still rice means no sound; two cards for foil and mirror; code cards for both ends and two messages by default; a sunny-day answer; the cupboard question is revisited; and the banner now says the unit draws on NGSS without being formally aligned. Fable 5.2 reasoned some of these (band pitch, faint stars, daylight torches) rather than testing them. The follow-up commit is 71dc67b, which Fable 5.2 also diff-checked the same day; its four small leftovers (lesson 1 Stretch, lesson 5 coded cards, lesson 2 tapping turns, README flap position) were fixed in ab23d6b.
- The peep-box diagram in lesson 3 (peep-box.svg) was drawn by Claude Fable 5.2 and added in commit c72a0d2 (CC0, like the rest of the repo). It is a layout sketch; nobody has built a box from it in a classroom.
- The order of lessons, the activities and the timings are my choice, not taken from a source.

Lesson 1: Shake, rattle, hum: what makes a sound?

Unit overview - Next: Lesson 2

Goal: Children find that sounds are made when something shakes back and forth very fast (vibrates), and that the sound stops when the shaking stops.

Length: about 40 minutes.

Materials

- Per group of 3-4: an open shoebox or plastic tub, three rubber bands of different widths (latex-free if needed), fitted round the box by an adult before the lesson, a plastic 30 cm ruler.
- Whole class: a drum or tambourine.
- A cardboard tube (for example a kitchen-roll tube) for children who do not use their voice.
- Two picture cards for the closing check: "shaking" and "still".
- Whiteboards and pens, or paper and pencils.
- Ear defenders for any child who wants them.

Steps

✎ Opening (5 min)

Agree the "hands up, everything stops" signal and practise it once. Tap the drum gently, then put a flat hand on it. "What happened to the sound when my hand touched the drum?" (It stopped.) "Today we find out what is happening when something makes a sound."

✎ Main activity (25 min)

1. **Humming (5 min).** Everyone puts their fingertips gently on the front of their throat and hums, then stops, then hums again. "What do you feel when you hum? When you stop?" (A buzzing or tickle when humming; nothing when quiet.) Children who do not use their voice can hold a cardboard tube and feel it buzz while a partner hums into it, or feel the drum instead.
2. **Rubber band box (10 min).** Each group has its box with the three bands already on. Pluck one band. "Look closely from the side: what is the band doing?" (It moves back and forth fast; it looks blurry.) Put a finger on the band. "What happens to the sound?" (It stops.) Try the narrow band and the wide band. "Do they sound the same?" (They may sound a little different or about the same; bands vary, so accept what children hear. The ruler in step 3 shows higher and lower more reliably.)
3. **Ruler over the edge (10 min).** Press one end of the ruler flat on the table with one hand, with about half the ruler sticking out over the edge. With the other hand push the free end down a little and let go. "What do you see and hear?" (The ruler moves up and down fast and makes a buzzing sound.) Make the part over the edge shorter and try

again. (The sound usually gets higher and the shaking faster.) Children draw the ruler with "shaking lines".

✓ Discussion questions (5 min, with answers)

- What did the band, the ruler and your throat all do when they made a sound? They shook back and forth very fast. Scientists call this **vibrating**.
- How can you stop a sound? Stop the vibrating: touch the band, hold the ruler, put a hand on the drum, stop humming.
- Does something have to be big to vibrate? No; a thin band vibrates too, sometimes too fast to see, but we can feel it or hear it.

✓ Closing check (5 min, with answers)

Tap the drum. "What is the drum skin doing?" (Vibrating / shaking fast.) "How can I stop the sound?" (Put a hand on it, stop the vibrating.) Children answer by saying, signing, showing with their hands or pointing to a "shaking" or "still" picture card.

Vocabulary

sound, vibrate, vibration, shake, pluck, tap, higher, lower, loud, quiet

Differentiation

- **Support:** use only the drum and one rubber band; children copy the teacher's "shaking hands" gesture to show vibrating.
- **Stretch:** "Can you make the band sound higher without changing the band?" (Press it down with a finger to make the moving part shorter. An adult can also show what happens when the band is pulled tighter.)

⚠ Safety

- An adult fits the bands round the box before the lesson; children pluck them but do not take them off or stretch them.
- Children look at a plucked band from the side, not with a face close above it.
- Bands stretch only round the box, never towards people or faces.
- Rulers stay pressed to the table; no flicking towards others.
- Keep sounds comfortable; use the stop signal.

Access

- Deaf and hard-of-hearing children feel the drum, the box and their throat; feeling the vibration is a full answer.
- Children with limited hand movement can tap the drum with a whole hand or watch the band while a partner plucks and say "now".
- Offer ear defenders and the role of "watcher" for sound-sensitive children.

Teacher notes

- Timing: 5 + 25 (5 + 10 + 10) + 5 + 5 = 40 minutes.
- Children often think sound is "in" the drum or comes from the hitting itself. Keep coming back to "What is it doing while it makes a sound?"
- Higher and lower here means pitch, not loudness; some children use "high" for "loud". Model both words with the drum (soft tap, hard tap) and the ruler (long overhang lower, short overhang higher).

Lesson 2: Can sound make things move?

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children see and feel that sound can make other things vibrate, and practise saying what they did and what they saw.

Length: about 40 minutes.

Materials

- Per group: a plastic bowl with cling film stretched tight over the top and held with a rubber band; about a teaspoon of uncooked rice (or a few small paper confetti pieces); a metal baking tray and a wooden spoon.
- Whole class: a drum. If you have them: a tuning fork and a bowl of water; a speaker playing music at a classroom volume and a sheet of paper.
- A sweeping brush and dustpan for the rice.
- A balloon, blown up and tied by an adult, for children who feel the vibration instead of seeing it (see Access); check the latex allergy list.
- Two picture cards for the closing check: rice jumping beside a tapped tray, and still rice with no tapping.
- Whiteboards and pens, or paper and pencils.
- Ear defenders for any child who wants them.

Steps

✎ Opening (5 min)

Recap lesson 1: "What is something doing when it makes a sound?" (Vibrating.) "Today's question is the other way round: can a sound make something ELSE vibrate, without touching it?"

✎ Main activity (25 min)

1. **Rice on the drum bowl (12 min).** Groups sprinkle the rice on the cling film. Groups take turns to tap, one group at a time, so a neighbour's tray does not move the rice and the room stays calm; the others watch. With more than four groups, give each group about two minutes, or use one tapping station at the front where groups bring their bowls in turn (reasoned, not tested). One child holds the tray in the air with both hands, about a hand's width from the bowl and not touching it or the table, and a partner taps it with the spoon. "What does the rice do?" (It jumps or shuffles.) Try a gentle tap and a harder tap. "When does the rice move more?" (Usually with the louder tap.) Try holding the tray further away. (The rice usually moves less.)
2. **Is it the table? (5 min).** "Could the table be shaking the bowl?" Children check that the tray is held in the air and that nobody bumps the table. Try tapping the table gently with a finger instead: does the rice move? Talk about what they found; the aim is to notice what else could be causing it.

3. **Feel and see (8 min).** Teacher demonstrations, children close by:
    - Children put a flat hand on a drum on the table while the teacher taps a second drum or tray close to it (not touching). Some children can feel a tiny buzz.
    - If you have a tuning fork: strike it on a rubber heel or a cushion and touch the tips to the water. (Small splashes or ripples: the fork is vibrating.)
    - If you have a speaker: hold paper close in front of it while music plays at a normal level; children can feel it flutter with fingertips.

✓ Discussion questions (5 min, with answers)

- Nobody touched the bowl. What made the rice move? The sound from the tray made the cling film vibrate, and that made the rice jump.
- What changed when we tapped harder? The sound was louder and the rice usually moved more.
- Why did we hold the tray off the table? So we knew it was the sound, not a shaking table, that moved the rice.

✓ Closing check (5 min, with answers)

Show two pictures: a tray being tapped next to a covered bowl with rice in the air, and the same bowl with no tapping and still rice. "In which picture is the tray being tapped? What is making the rice jump?" (The first: the sound from the tapped tray makes the cover vibrate, and that makes the rice jump. A quiet or far-away sound may not move the rice at all.) Children answer by pointing, saying, signing or drawing.

Vocabulary

vibrate, sound, loud, quiet, near, far, cause

Differentiation

- **Support:** the teacher taps; children only watch and say "moving" or "still".
- **Stretch:** "Can you make the rice move without making a louder sound?" (Bring the tray closer.) "Can you stop the rice moving while you keep tapping?" (Put a hand on the cover, move the tray far away.)

⚠ Safety

- Rice stays on the covered bowl; nobody puts it in mouths, noses or ears. Use paper confetti for any group where this might happen. Sweep up after.
- An adult blows up and ties the balloon; if it bursts, an adult picks up every piece and bins it at once (balloon pieces are a choking risk).
- Keep taps at a comfortable level; use the stop signal. The speaker stays at a normal classroom volume.
- Tuning fork: strike it on a rubber heel or cushion, never on a table or a person.

Access

- Deaf and hard-of-hearing children can rest a fingertip lightly on the cling film, or hold a balloon near the tray, and feel the buzz.
- Blind and low-vision children can feel the cling film and the paper near the speaker; a partner says when the rice is moving.
- Offer ear defenders and the role of "watcher" or "recorder"; the watcher says what the rice did.

Teacher notes

- Timing: 5 + 25 (12 + 5 + 8) + 5 + 5 = 40 minutes.
- Cling film must be tight like a drum skin; a loose cover barely moves. Test beforehand.
- How sound travels through the air is not taught here; it is enough for children to say "the sound made it vibrate".
- This lesson is a comparison, not a full fair test: loudness and distance are both changed by hand. Ask children to say what they saw.

Lesson 3: Can we see in the dark?

Unit overview - Previous: Lesson 2 - Next: Lesson 4

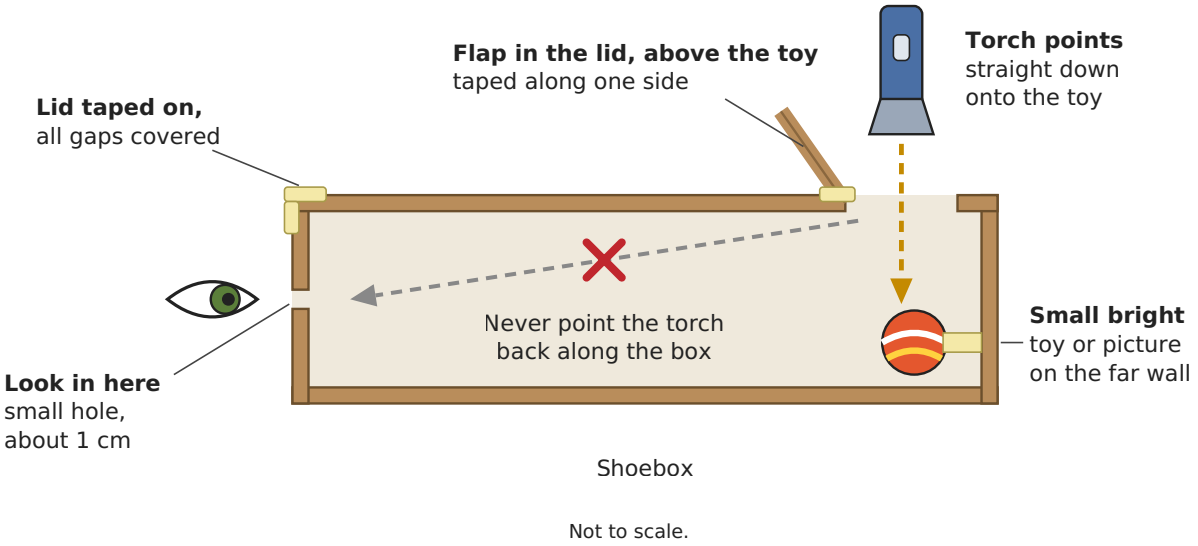
Goal: Children find that we can see things only when there is light: light shines on them, or they give off their own light. They tell light sources from shiny things.

Length: about 40 minutes.

Materials

- One peep box per group: a shoebox with the lid taped on and all gaps covered, a small hole (about 1 cm) in one end to look through, and a flap cut in the lid at the far end, above the toy (taped along one side), that opens to let light in. Inside, a small bright toy or picture stuck to the far wall. Make these before the lesson and check that, with the flap shut, the inside looks dark.
- One small LED torch per group (battery cover screwed shut).
- Per group: a glow-in-the-dark star (charged under a lamp before the lesson, and again with the group's torch for about 30 seconds just before it goes in the box), a piece of kitchen foil with folded edges, a plastic safety mirror.
- Picture cards: Sun, candle flame, lamp (switched on), torch (switched on), Moon, mirror, spoon, foil. Two sorting mats: "makes its own light" (a picture of a lamp shining) and "does not make its own light" (a picture of a closed box).
- Optional: a phone camera, to photograph the inside of a box (flap shut and flap open) for children who cannot look through the hole.
- Whiteboards and pens, or paper and pencils.

Peep box, seen from the side (near side cut away)



Not to scale.

Steps

✎ Opening (5 min)

Safety first: "Never look at the Sun. Never shine a torch into anyone's eyes." Children repeat it with actions (hands over eyes; torch pointing down). Then: "If you were in a cupboard with the door shut and no light at all, could you see your hand?" Take guesses; do not give the answer yet.

✎ Main activity (25 min)

1. **Peep box, flap shut (7 min).** Each child in turn looks through the hole with the flap shut. "What can you see?" (Nothing, or only darkness.) Children draw what they saw (a dark box). Nobody says what is inside yet.
2. **Flap open, or torch in (8 min).** Open the flap a little, or the torch holder shines the torch straight down through the flap onto the toy, pointing away from the peephole end, never back along the box. Look again. "What can you see now?" (The toy or picture.) Shut the flap again: it disappears. Children draw the second picture next to the first.
3. **What makes light? (10 min).** With the flap shut, recharge the glow star with the torch, put it inside and look. (It can be seen, faintly: it gives off its own light.) Take the star out. Then put the foil and the mirror inside with the flap shut. (They cannot be seen: they are shiny, but they do not make light.) Groups sort the picture cards onto the two mats.

✓ Discussion questions (5 min, with answers)

- Why could you not see the toy with the flap shut? There was no light in the box, and we need light to see things.
- Back to the cupboard: with the door shut and no light at all, could you see your hand? No. Like the toy in the shut box, we need some light to see.
- The foil is shiny. Why couldn't we see it in the dark box? Shiny things do not make their own light; they only bounce light that shines on them.
- Is the Moon a light source? No. The Moon looks bright because sunlight shines on it and bounces off. (Accept "it looks like one"; this is surprising for many adults too.)

✓ Closing check (5 min, with answers)

Show the torch, the glow star, the foil and the mirror. "Which ones make their own light?" (Torch, glow star.) "Which only shine when light is on them?" (Foil, mirror.) "Could you see the toy in the box with no light at all?" (No.) Children answer by pointing, signing, saying or sorting.

Vocabulary

light, dark, light source, shiny, bounce, glow, see

Differentiation

- **Support:** sort only the torch, a lamp card, foil and a mirror.
- **Stretch:** "A cat walks into a room with no light at all. Can it see?" (No. Cats see well in dim light, but they still need some light.)

⚠ Safety

- Never look at the Sun; never shine torches into eyes.
- In the peep box, the torch always points down onto the toy, away from the peephole, while a child is looking.
- The classroom stays lit; the dark is inside the box only.
- Plastic safety mirrors only; fold the foil edges over.
- Glow sticks, if used instead of stars, stay closed and are not bitten.

Access

- Children who dislike the dark only look into a small box; they never sit in the dark.
- Blind and low-vision children can feel the objects inside the open box and take the "sorting" role; a partner describes what they see through the hole. Some low-vision children can tell the torch on or off by brightness.
- Children who cannot hold their eye to a hole can look at a photograph taken through the hole with a phone camera, flap shut and flap open.

Teacher notes

- Timing: 5 + 25 (7 + 8 + 10) + 5 + 5 = 40 minutes.
- A common idea at this age is that our eyes "get used to" the dark and will see eventually. In a truly dark box they do not; if a child sees a little, look for a gap letting light in and tape it.
- The standard's clarification statement suggests a pinhole box or a completely dark room; this unit uses the box so no child has to be in the dark.

Lesson 4: Through, some, blocked or bounced

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children test what happens when different materials are put in a torch beam, and sort them: lets light through, lets some light through, blocks light (dark shadow), bounces light (shiny).

Length: about 40 minutes.

Materials

- Per group: a small LED torch; a white card standing up (or a pale wall); a tray of test objects: a clear plastic cup or sheet, a clear plastic bag cut open into a flat sheet, baking paper (or wax paper), tissue paper, cardboard, a wooden block, kitchen foil (edges folded), a plastic safety mirror, a piece of cloth.
- A large class sorting table with four columns and picture headings: an open door ("through"), a half-open door ("some through"), a closed door ("blocked"), a bouncing ball ("bounced"). Picture cards of each test object, with two cards each for the foil and the mirror (they can go in two columns). Columns also differ by shape or texture, not only colour.
- A group sorting sheet with the same four columns, per group (step 2).
- For the closing check: a plastic sandwich box, a paper plate and a metal spoon.
- Whiteboards and pens, or paper and pencils.

Steps

✎ Opening (5 min)

Repeat the safety rules (never look at the Sun; never shine a torch into eyes; torches point at the card). Shine a torch on the white card: "What do you see?" (A bright patch.) Hold your hand in the beam: "What happens?" (A dark shadow; the hand blocks the light.)

✎ Main activity (25 min)

1. **Predict (5 min).** Hold up the clear cup, the cardboard and the baking paper. "What do you think will happen on the card if I put each one in the beam?" Children point to a column. No wrong guesses.
2. **Test (15 min).** In groups, one child shines the torch at the card from about one ruler away, one holds an object in the beam, one looks at the card and says what they see: "bright patch" (through), "dim or blurry patch" (some through), "dark shadow" (blocked). Shiny objects: tilt them in the beam and look for a bright spot on the wall or table (bounced). Children place each picture card in a column on their group sheet. Keep the torch at the same distance for every object.
3. **Class table (5 min).** Groups put their cards on the class table. Where groups disagree, test the object again together.

✓ Discussion questions (5 min, with answers)

- Which materials let the light through? Clear plastic (cup, sheet, flat bag). The patch on the card is still bright.
- Which let some light through? Baking paper, tissue paper, often thin cloth. The patch is dim or blurry.
- Which blocked it? Cardboard, wood, thick cloth, foil. A dark shadow on the card.
- Foil went in two columns. Is that wrong? No. Foil blocks light (shadow behind it) and bounces it (bright spot when tilted). The mirror does both too. Some objects do more than one thing.
- Why did we keep the torch the same distance each time? So only the object changed and the test was fair to each object.

✓ Closing check (5 min, with answers)

Hold up a new object not used before (for example a plastic sandwich box, a paper plate, a metal spoon). "Where will it go? Let's test." (Usually: clear box through or some through; paper plate blocked or some through; spoon blocks and bounces.) Children point to the column first, then check.

Vocabulary

through, some through, blocked, bounced, shadow, beam, shiny. Optional science words: transparent, translucent, opaque, reflect.

Differentiation

- **Support:** test three objects only (clear cup, baking paper, cardboard); use the three door pictures. Middle option: six objects (clear cup, baking paper, tissue paper, cardboard, foil, mirror).
- **Stretch:** "Make the shadow of the block bigger without changing the block." (Move the block closer to the torch.) Or: use the mirror to bounce the beam onto a target on the wall.

⚠ Safety

- Never look at the Sun; never shine torches into eyes or bounce the beam into faces with mirrors. Mirrors point at the wall or floor.
- Plastic safety mirrors only; fold foil edges.
- The plastic bag is cut open into a flat sheet before the lesson and stays on the table; nothing goes over heads or faces.

Access

- Blind and low-vision children can hold each object in the beam while a partner describes the card; the class table can have the real objects stuck to it so it can be read by touch.
- Children answer by pointing, signing, saying or placing a card.
- Columns use door pictures and shapes, not colour alone.

Teacher notes

- Timing: 5 + 25 (5 + 15 + 5) + 5 + 5 = 40 minutes.
- Results depend on the torch and the material (thin cloth may let some light through; a crumpled bag may look cloudy). Record what each group actually saw and talk about differences.
- The speed of light is not part of this unit (the standard's assessment boundary leaves it out).

Lesson 5: Sending a message across the room

Unit overview - Previous: Lesson 4

Goal: Children design, build, test and improve a way to send a simple message across the room or playground using sound or light, and say what they tried, what happened and what they changed.

Length: about 40 minutes (a second session for another round of improving is welcome).

Materials

- Per group: two paper or plastic cups with a small hole in the base, about 5 m of string, two paper clips (or short pieces of craft stick) to tie off the string inside each cup; a drum, or a tray and wooden spoon; a small LED torch.
- Message picture cards, one set per group: "come here", "stop", "wave", "sit down".
- A "test and change" sheet per group with three picture rows: try it (a hand), what happened (an eye and an ear), what we changed (a spanner).
- Two small blank code cards per group (one for the sender, one for the receiver).
- Pencils or pens to draw the code and mark the sheet.
- Ear defenders for any child who wants them.
- A large space: the hall, the playground, or the classroom with desks pushed back. Torch codes need an indoor or shaded wall; a small torch is hard to see outdoors in daylight.

Steps

✎ Opening (5 min)

"Your friend is at the other end of the playground. It is too far to talk quietly. How could you send them a message using sound or light, without shouting?" Collect ideas (a whistle, waving, a torch, a drum, a phone). Show the three choices for today: a cup telephone, a drum-beat code or a torch-flash code. Remind everyone of the safety rules (string never round fingers or necks; torches never in eyes; comfortable sounds).

✎ Main activity (25 min)

1. **Plan (5 min).** Each group chooses a device and a code. For drum or torch codes, the group agrees a pattern for two message cards, for example: 2 beats or flashes = "come here"; a long flash or a roll = "stop". Draw the code twice, once on each code card, so the sender and the receiver each have one.
2. **Build (5 min).** Cup telephone: thread the string through the holes and tie it to a paper clip inside each cup (adult helps with knots). Drum or torch: practise the code at the table.
3. **Test (8 min).** The sender stands at one end of the space, the receiver at the other (about 5 m apart, with the cup string pulled straight). The sender picks one of the coded message cards (two, or four for the Stretch) without showing it and sends it. Torch senders shine onto a wall or a card standing beside the receiver, never at the

receiver; the receiver watches the wall or card. The receiver checks the code card and does the action. Did it work? Mark the "what happened" row.

4. **Improve and test again (7 min).** "What could make it work better?" Ideas to try: pull the string tighter, keep it off the floor and away from other things touching it; beat or flash more slowly; leave a gap between messages; use a bigger torch beam on a pale wall; agree a "ready" signal first. Change ONE thing, test again, mark the "what we changed" row.

✓ Discussion questions (5 min, with answers)

- Why does the cup telephone work? Talking into the cup makes it vibrate; the tight string carries the vibration to the other cup, which vibrates and makes the sound.
- What happened when the string was loose or touching something? It usually worked badly or not at all; the vibrations did not get through.
- What made the torch or drum code easier to understand? Going slowly, leaving gaps, starting with a "ready" signal, and both people knowing the code.
- Which works better in a noisy playground, sound or light? On a sunny day? Answers vary: light codes work when it is noisy; sound codes work when you cannot see each other. On a sunny day a small torch is hard to see, so a sound code may work better. Accept reasons.

✓ Closing check (5 min, with answers)

Each group shows its sheet. "What did you try? What happened? What did you change?" (Any honest answer that names a change and a result is a success, including "it still didn't work".) Then: "Your friend is around a corner where they cannot see you. Would you send a light code or a sound code?" (A sound code, because light needs a clear line to be seen.)

Vocabulary

message, signal, code, send, receive, test, improve, design

Differentiation

- **Support:** use the drum and send only one message ("stop").
- **Stretch:** add codes for "wave" and "sit down" (four messages), invent a code for a new message, or test how far apart the cup telephone still works (count steps).

⚠ Safety

- String is never wrapped round fingers, wrists or necks; pairs walk, not run, to stretch it; keep strings out of walkways.
- Torches point at a wall or card beside the receiver, or the floor near them, never at eyes. Never look at the Sun outdoors.
- Drum taps at a comfortable level; agree the stop signal.

Access

- Deaf and hard-of-hearing children can use the torch code, or feel a tug code on the cup string (one tug, two tugs).
- Blind and low-vision children can use the drum code or the cup telephone.
- Children with limited hand movement can tap with a whole hand, press a large-button torch or choose the message while a partner sends it.
- Children who do not use speech can send a code on the cup telephone by tapping the cup, or use the torch or drum.

Teacher notes

- Timing: 5 + 25 (5 + 5 + 8 + 7) + 5 + 5 = 40 minutes.
- Cup telephones work best with thin, tight string and stiff cups; test one beforehand. If none work well, the drum and torch codes still meet the goal.
- The point is the design cycle (try, look, change, try again), not a perfect device. Praise clear reasons for changes.
- Technological details (how phones or radios work) are not part of this unit.

Grade 1 Science: Patterns in the Sky: Sun, Moon, Stars and Daylight (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 9 November 2026. No educator has reviewed or classroom-tested this unit. It draws on NGSS (see Sources) but is not formally aligned to any official standard. Check every safety note against your school's rules.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the science progression | Grade 1 year plan - Term 2

Big idea

The sky has patterns we can see, describe and use to predict. Every day the Sun seems to rise in one part of the sky, move across it and set in another, and shadows move as it does. The Moon also seems to rise, move and set, can sometimes be seen in the daytime, and seems to change shape in a pattern that repeats about every four weeks. Stars other than the Sun can be seen at night but not in the day. There is less daylight in winter than in spring, summer or autumn.

This is the term 2 science unit of grade 1. It builds on the term 1 unit Sound and light (shadows form away from a light; we see things only when there is light; the Moon does not make its own light) and on kindergarten weather watching.

Outcomes

By the end of the unit most children can:

1. Use shadow marks made at three times of one day to say that the Sun seems to move across the sky, and that shadows are usually shortest around the middle of the day.
2. Put pictures of one day's sky in order (rising, high, setting, night) and use the pattern to predict where the Sun will be next morning.
3. Say that the Moon can sometimes be seen in the day, and put Moon shape pictures in an order where the shape grows and then shrinks.
4. Say that stars can be seen at night but not in the day, and use a model (a small light in a bright or dark box) to show why.
5. Compare two day strips and say that there is less daylight in winter than in spring.

Prior knowledge

- From Sound and light: a shadow forms on the side of an object away from the light; we never look at the Sun; the Moon is lit by the Sun.
- From kindergarten: describing the weather, day and night, words like morning and afternoon.

Lessons

1. Where is the Sun now? - marking a shadow three times in one day.
2. Up, across and down - the Sun's daily pattern and a prediction.
3. The Moon has patterns too - the daytime Moon and the changing shape.
4. Where are the stars in the day? - stars at night, and a bright-room model.
5. Long days and short days - comparing daylight in winter and spring, and starting a sky diary.

Materials (whole class unless noted)

- Lesson 1: one shadow post per group of four (blunt stick or ruler in plasticine on card, or in a cone); per group three colours of chalk (or coloured sticky dots and large paper indoors), a beanbag and three clock cards; masking tape; class shadow chart; a picture of the Sun and a "never look" card; three shadow picture cards; water and sun protection.
- Lesson 2: the lesson 1 chart and photos of the chalk shadows; a teacher- drawn window view picture with the sunrise and sunset sides marked; a card Sun on a stick; per pair six Little Hill sky cards and an ordering strip; tactile versions of the cards.
- Lesson 3: Moon shape cards (eight shapes; one class set and one set per group of four, with ordering strips); tactile foam or card Moon shapes; the Little Hill sky strip and a card Moon on a stick; "Moon at night, Moon in the day" pictures; optional morning Moon look (check a Moon calendar); optional teacher photo of the daytime Moon.
- Lesson 4: Little Hill day and night pictures; one LED torch or battery tea-light per group; per group a peep box from the Sound and light unit with a small battery light inside; about 10 charged glow stars on black card; blinds or a blanket-covered table; sorting mat and six picture cards (Sun, Moon, stars, clouds, rainbow, birds); a ticking timer or small bell and some music at a comfortable volume.
- Lesson 5: two big Pip day strips (winter and spring) and small copies per pair; tactile strips (smooth for light, rough for dark); a set of Pip's day picture cards per pair; two early-evening photos of the same view; a class sky diary sheet with blank day strips; weekly sunrise and sunset times for the teacher; yellow and dark blue counters, crayons or stickers.

Assessment

- During lessons: shadow records (lesson 1), the ordered sky strip (lesson 2), the ordered Moon cards (lesson 3), the day/night sort (lesson 4) and the Pip strips (lesson 5).
- Closing checks at the end of each lesson (answers are in each lesson).
- One-to-one check, about 4 minutes per child, any time in the last week. Children may answer by pointing, signing, placing a card or speaking:
    1. Show three shadow pictures. "Which shadow is from the middle of the day?" (The shortest one.) (Outcome 1)
    2. Give three Little Hill cards (rising, high, setting). "Put them in order. Where will the Sun be tomorrow morning?" (Low on the sunrise side.) (Outcome 2)
    3. "Can we ever see the Moon in the day?" (Yes, sometimes.) Give three Moon shapes: "Put them in order so it gets bigger." (Outcome 3)
    4. Show the day and night pictures. "When can we see stars?" (At night.) "Why not in the day?" (The Sun is too bright.) (Outcome 4)
    5. Show the two Pip strips. "Which is the winter day? How do you know?" (More dark blue; less daylight.) (Outcome 5)

⚠ Safety (read before lesson 1)

- Never look at the Sun, directly or through sunglasses, binoculars, a phone screen or anything else. Children stand with their backs to it when looking at shadows. Use the "never look" card in every lesson that goes outside.
- Shadow posts have blunt tops and stand in plasticine or a cone.
- Outdoor visits: sun protection and water as your school requires; keep visits short in cold weather.
- Torches point at the floor or into a box, never at eyes. Battery lights only, no candles.
- Darkened room: clear the floor, keep a light near the door, and let any child who dislikes the dark stay in the light.
- Music in the lesson 4 sound model at a comfortable volume.
- Never ask children what time they get up or go to bed, whether they go out after dark, or about their home or bedroom window; use the made-up place Little Hill and the made-up child Pip.

Access and taking part

- Every lesson has a tactile or sound route: masking tape and beanbags on shadows, felt and string sky cards, foam Moon shapes, a ticking-timer model for stars, rough and smooth day strips.
- Answers by pointing, placing cards, signing or speaking all count.
- Children who use a wheelchair or cannot crouch use a shadow post on a table or windowsill.
- Colour is never the only clue: the day strips also carry small sun and moon symbols.
- Going into a darkened space or acting out the Sun's path is always optional; watching from the edge counts.

Sources

- NGSS, "1. Space Systems: Patterns and Cycles" (topic arrangement), read 9 November 2026: https://www.nextgenscience.org/topic-arrangement/1space-systems-patterns-and-cycles
  - 1-ESS1-1: "Use observations of the sun, moon, and stars to describe patterns that can be predicted." Clarification statement: "Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day." Assessment boundary: "Assessment of star patterns is limited to stars being seen at night and not during the day."
  - 1-ESS1-2: "Make observations at different times of year to relate the amount of daylight to the time of year." Clarification statement: "Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall." Assessment boundary: "Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight."
  - Disciplinary core ideas ESS1.A: "Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted." ESS1.B: "Seasonal patterns of sunrise and sunset can be observed, described, and predicted."
- The Moon's changing shape (lesson 3) goes a little beyond the two performance expectations above; it is included as a pattern children can observe, and is not assessed beyond ordering pictures.

- Other statements (the Sun is a star; the stars are still there in the day; the Earth's shadow does not cause the Moon's shapes; daylight changes little near the equator) are general science knowledge that I did not check against a specific source for this unit.

Known gaps and cautions

- Written 9 November 2026. Text-checked by Gemini 4 Argon the same day (links, timings, outcomes against the one-to-one check, privacy, sun safety and access routes): no errors reported, so no changes were needed. Not yet checked by a teacher.
- Lesson 1 needs a sunny day and two short return visits; cloudy weather may spread it over several days.
- The sky diary in lesson 5 runs until term 3, so the comparison children make in this unit is with made-up Pip strips and photos; the class's own comparison comes later.
- Southern hemisphere and near-equator classes need the changes in the lesson 5 teacher notes.
- The Moon shape cards must be drawn or chosen by the teacher; no illustrations are provided yet.
- The lesson order assumes term 2 falls in the darker part of the year.

Lesson 1: Where is the Sun now?

Unit overview - Next: Lesson 2

Goal: Children mark a shadow three times in one school day, without ever looking at the Sun, and use the marks to say that the Sun seems to move across the sky during the day.

Length: about 40 minutes in the morning, plus two short visits (about 5 minutes each) at midday and in the afternoon. Use a dry, sunny day; if the sky clouds over, see Teacher notes.

Materials

- One shadow post per group of four: a stick or ruler pushed upright into a plasticine lump on a square of card, or a traffic cone with a stick taped to it, placed on flat playground or a sunny windowsill.
- Per group: three pieces of chalk in different colours (or three coloured sticky dots and a sheet of large paper taped under the post if indoors), a small beanbag, and a picture card of a clock face for each visit (morning, midday, afternoon), drawn by the teacher.
- Masking tape to mark exactly where each post stands, so it can be put back in the same place.
- A large class chart: "Morning", "Midday", "Afternoon", with a space for each group's drawing of where the shadow pointed.
- A picture of the Sun, and a "never look" card: an eye looking at the Sun, crossed out.
- Picture cards for the closing check: a post with a long shadow pointing one way, a short shadow, and a long shadow pointing the other way.
- Water and sun protection as your school requires when outside.

Steps

✎ Opening (5 min)

Hold up the picture of the Sun and the "never look" card. "We never look at the Sun, not even for a second, and not with sunglasses. It can hurt our eyes. Today we will find out where the Sun is by looking at shadows instead." Remind the class of the sound-and-light unit: a shadow forms on the side of an object away from the light. Ask: "If my shadow is in front of me, where is the light?" (Behind me.)

✎ Main activity (25 min)

1. Outside, each group stands its post on the taped square. Children walk round the post and find its shadow. The shadow tip is where the line of dark ends.
2. One child holds the post steady, one draws a chalk line along the shadow (first colour), one places the beanbag on the tip, one draws the clock card for "morning" on the group's record. Swap jobs so everyone has one turn.
3. Ask each group: "Is the shadow long or short? Which way is it pointing? Point to something the shadow points at (the fence, the gate, a tree)."
4. Children stand with their backs to the Sun, look at their own shadow, and say which way it points. Never turn round to look at the Sun.

5. Predict together: "When we come back at midday, will the shadow be in the same place? Longer or shorter?" Write the class's guesses on the chart, all of them, without saying which is right.
6. At midday and again in the afternoon (about 5 minutes each), groups return, check that the post is still on its tape, and draw the new shadow in the second and third colours.

✓ Discussion questions (5 min, with answers)

Do these after the afternoon visit, in the classroom.

- Did the shadow stay in the same place? (No; it moved, and changed length.)
- Did the post move? (No, it stayed on the tape.) So what moved? (The light, the Sun, seemed to move across the sky.)
- When was the shadow shortest? (Usually around the middle of the day, when the Sun is highest in the sky.)

✓ Closing check (5 min, with answers)

Show the three shadow picture cards. "Which picture shows the morning shadow? Which the middle of the day? Which the afternoon?" Accept answers that match what the class saw: the longest shadows early and late, the shortest near the middle of the day, the morning and afternoon shadows pointing different ways. Ask: "Did the Sun move or the post?" (The Sun seemed to move; the post did not.)

Vocabulary

shadow, sky, morning, midday, afternoon, long, short, move

Differentiation

- Support: one job only (beanbag on the tip); compare just two marks, morning and afternoon, with "Is it the same place or a different place?"
- Stretch: predict where the next shadow will be by placing the beanbag before drawing it, then check.
- Early finishers: draw the post and all three shadows from above on paper.

⚠ Safety

- Never look at the Sun, directly or through sunglasses, binoculars, a phone screen or anything else. Children stand with their backs to it.
- Sun protection and water as your school requires; keep outdoor visits short in cold weather.
- Posts must not be sharp at the top; use a ruler or a stick with a blunt end, held in plasticine or a cone.

Access

- Blind or low-vision children: lay a long strip of masking tape along each shadow so it can be felt, and put a beanbag on each tip; they can feel that the beanbags are in different places. A partner can describe the shadow.
- Children who use a wheelchair or cannot crouch: put the post on a table or a sunny windowsill at a reachable height, with paper under it.
- Non-speaking children: point to the picture card or the beanbag; answers by pointing count fully.
- Deaf children: show the "never look at the Sun" rule as a picture card (a crossed-out eye looking at the Sun) and sign or gesture it.

Teacher notes

- If the day turns cloudy, mark what you have and finish another sunny day with the posts back on their taped squares. A window shadow (the frame on the floor) can be marked with tape instead.
- Children do not need to know that the Earth turns; the grade 1 aim is to describe the pattern. If someone asks, "Scientists found out the Sun only seems to move, because the Earth is spinning" is fine; do not test it.
- Do not tell children which compass direction the shadows point; it depends on where you are and the time of year.

Lesson 2: Up, across and down

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children describe the daily pattern of the Sun: it seems to rise in one part of the sky, move across the sky, and set in another part. They use the pattern to predict where the Sun will be tomorrow.

Length: about 40 minutes.

Materials

- The class shadow chart from lesson 1, and a photo or drawing of each group's three chalk shadows.
- A "window view" picture: a large drawing of what the class sees from one window (buildings, trees, hills), drawn by the teacher before the lesson. Mark on it, from the teacher's own checking or a sunrise app, the side where the Sun comes up and the side where it goes down at this time of year.
- A yellow card circle (the "card Sun") on a stick.
- Per pair: a set of six picture cards of one made-up place, Little Hill, on one day: dark with stars; Sun just above the hills on one side; Sun higher; Sun high in the middle; Sun lower on the other side; Sun just going down behind the hills. Cards are drawn so the hills and houses are the same in every picture.
- Per pair: a strip of card with six empty boxes to put the cards in order.
- Tactile version for blind or low-vision children: the same six cards with a raised felt circle for the Sun and a string line for the hills.
- Picture of the Sun with a "never look" cross, from lesson 1.

Steps

✎ Opening (5 min)

Look at the lesson 1 chart. "The post stayed still, but the shadow moved. What was moving?" (The Sun seemed to.) "Where do you think the Sun was first thing in the morning, before school?" Take a few ideas.

✎ Main activity (25 min)

1. Show the window view picture. Use the card Sun on its stick to show its path: low on the sunrise side early in the morning, higher towards the middle of the day, lower on the other side in the afternoon, gone below the edge at sunset. Children trace the path in the air with a finger.
2. Children act it out: crouch low (sunrise), stand up slowly with arms up (midday), sink down on the other side (sunset), then curl up (night). Do it twice, slowly. Anyone may do it sitting, with arms only.
3. Pairs put the six Little Hill cards in order on their strip, from dark to dark again. Ask each pair: "How did you know which came next?"
4. Pairs check against each other: are the strips the same?

5. Ask: "Tomorrow morning, where will the Sun be?" (Low on the sunrise side again.) "How do you know?" (Because it happens every day; it is a pattern.) If you can, check the prediction tomorrow with one quick look at a shadow post (lesson 1 positions).

✓ Discussion questions (5 min, with answers)

- Does the Sun come up on the same side every day? (Yes, roughly the same side, so we can predict it.)
- Where does the Sun go at night? (It goes below the edge of what we can see; it is still there, but we cannot see it from here.)
- What is a pattern? (Something that happens again and again in the same way, so we can say what comes next.)

✓ Closing check (5 min, with answers)

Hold up two of the Little Hill cards out of order (for example "Sun high in the middle" and "Sun just above the hills on one side"). "Which comes first in the day?" (The low one on the sunrise side.) Then: "What comes after the Sun goes down?" (Night, dark.) Children answer by pointing to a card, holding up a finger for "first" or "second", or saying it.

Vocabulary

rise, set, sunrise, sunset, across, pattern, predict

Differentiation

- Support: use three cards only (rising, high, setting).
- Stretch: draw a seventh card for "next morning" and say why it looks like the first sunrise card.
- Early finishers: draw your own window view and add the Sun's path.

⚠ Safety

- The card Sun is for showing the path; children never look at the real Sun to check it.
- Acting out: keep clear space around each child; arms only for anyone who prefers it.

Access

- Blind or low-vision children use the tactile cards; feeling the felt circle go from low to high to low tells the same story.
- Children with limited arm movement can say or point "low, high, low" instead of acting it.
- Non-speaking children: ordering the cards is the answer; no words needed.

Teacher notes

- Say "seems to rise" and "seems to move" at least sometimes; the Sun does not move round us, but grade 1 does not need the reason.
- The sunrise and sunset side change a little through the year, so do not name a fixed compass point; "roughly the same side" is accurate.
- Little Hill is made up so that no child is asked about their own home, bedroom window or morning.

Lesson 3: The Moon has patterns too

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children find that the Moon also seems to rise, move across the sky and set, that it can sometimes be seen in the daytime, and that its shape seems to change over about four weeks and then start again.

Length: about 40 minutes.

Materials

- Moon picture cards (drawn by the teacher, or printed from a source your school may use): eight pictures of the Moon's shape a few days apart, from a thin curve, through a half, to a full circle, and back to a thin curve on the other side.
- Per group of four: one set of the eight Moon shape cards, and a strip with eight boxes to put them in order.
- Tactile Moon cards: the same eight shapes cut from thick card or foam so the shape can be felt.
- The Little Hill sky strip from lesson 2, and a white card Moon on a stick.
- A "Moon at night, Moon in the day" pair of pictures: Little Hill at night with the Moon, and Little Hill in the morning with a pale Moon in a blue sky.
- Optional: a morning outdoor look when a Moon calendar shows the Moon is up in daylight (see Teacher notes).

Steps

✎ Opening (5 min)

"We found a pattern for the Sun. Does the Moon have patterns too?" Show the two Little Hill pictures. "Which one is wrong, the Moon in the day or the Moon at night?" Let children argue it; do not answer yet.

✎ Main activity (25 min)

1. Tell the class: "Both are right. The Moon also seems to come up, move across the sky and go down. Some days it is up at night, some days it is up in the daytime, and some days both." Move the card Moon along the lesson 2 path to show it.
2. If the Moon is up in the morning sky today (checked beforehand), go outside for five minutes and find it. Stand with backs to the Sun. Ask: "What shape is it today?"
3. Groups get the eight Moon shape cards, mixed up. "These pictures were made a few days apart. Can you put them in an order where each one changes only a little?" Groups try.
4. Show one correct order (thin curve, bigger, half, bigger, full, smaller, half, thin curve on the other side). Groups check theirs. Any order that grows and then shrinks step by step is a good try.

5. "What will come after the last card?" (It starts again: a new thin curve.) This is a pattern that takes about four weeks.

✓ Discussion questions (5 min, with answers)

- Can we see the Moon in the day? (Sometimes, yes.)
- Does the Moon always look the same shape? (No; it seems to change, then starts again.)
- Does the Moon make its own light? (No; this was in the sound and light unit. The Sun's light shines on it. Accept "the Sun lights it up".)

✓ Closing check (5 min, with answers)

Give each child three Moon cards from the middle of the set: half, bigger than half, full. "Put them in order so the Moon gets bigger." (Half, bigger than half, full.) Then hold up the "Moon in the day" picture: "Is this possible?" (Yes.)

Vocabulary

Moon, shape, full, half, curve, daytime, night-time, pattern

Differentiation

- Support: order only three cards (thin, half, full).
- Stretch: after ordering the cards, say how many "steps" it takes to get back to the first shape.
- Early finishers: draw tonight's Moon from the Moon calendar picture the teacher shows; nobody is asked to look at home.

⚠ Safety

- It is safe to look at the Moon. If the Moon is near the Sun in the sky, do not look for it; go back in.
- Outdoor visits: sun protection and water as your school requires.

Access

- Blind or low-vision children use the foam Moon cards and feel the shapes grow and shrink.
- Children who cannot go outside or cannot see the sky: show a photo of the daytime Moon that the teacher took, or a picture from a source your school may use.
- Non-speaking children: ordering cards and pointing to "yes" or "no" cards count fully.

Teacher notes

- Check a Moon calendar before this lesson. In the days after a full Moon the Moon is often still up in the morning sky, and in the days before a half Moon it is often up in the afternoon.
- Grade 1 does not need names for the shapes or the reason they change. "The Moon seems to change shape" is enough. Do not say the Earth's shadow causes the shapes; it does not.
- Looking at the Moon at home is optional and never set as homework, because some children cannot go out after dark or have no view of the sky.

Lesson 4: Where are the stars in the day?

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children say that stars (other than the Sun) can be seen at night but not in the daytime, and use a model to show that a small light is hard to see when everything around it is bright.

Length: about 40 minutes.

Materials

- Two pictures of the same Little Hill sky: one at night with the Moon and many stars, one in the daytime with the Sun (shown in the corner) and a blue sky with no stars.
- One small LED torch per group (battery cover screwed shut), or one battery tea-light per group.
- Per group: one peep box from the sound and light unit (lid taped, flap at the far end), with a small battery tea-light or a small LED stuck inside instead of the toy, switched on.
- About 10 glow-in-the-dark stars, charged under a lamp before the lesson, stuck to a large black card.
- A way to make part of the room darker: blinds, or a table with a thick blanket over it to make a "night tent".
- Sorting mat with two halves, "seen in the day" and "seen at night", and picture cards: Sun, Moon, stars, clouds, rainbow, birds.
- Sound model for blind or low-vision children (and useful for everyone): a quietly ticking kitchen timer or a small bell, and a few minutes of recorded or played music at a comfortable volume.

Steps

✎ Opening (5 min)

Show the two Little Hill pictures. "In the night picture there are lots of stars. In the day picture there are none. Where did the stars go?" Take ideas and write them down, without saying which is right.

✎ Main activity (25 min)

1. Model with a torch: in the bright classroom, a child switches a torch on and off, pointed at the floor. "Is it easy to see if it is on?" (Hard, or a little.) Then do the same inside the night tent or with the blinds down. (Easy.)
2. Peep boxes: each group looks at the small light inside their box, first with the flap open (light pouring in), then with the flap shut (dark inside). "When could you see the little light better?" (With the flap shut, when it was dark around it.)
3. Glow stars: hold up the black star card in the bright room; then turn off the lights and close blinds (or put it in the night tent). "Are there more stars or fewer when it is dark?" (We can see more, or see them better.)
4. Tell the class: "Scientists say the stars are still in the sky in the day. The Sun's light is so bright that we cannot see them, just like the little light in the box with the flap open."

5. Sorting: groups sort the picture cards onto "seen in the day" and "seen at night". The Moon can go on both, or across the middle. Ask: "Where did you put the stars? Why?"

✓ Discussion questions (5 min, with answers)

- When can we see stars? (At night, when it is dark.)
- Why can't we see them in the day? (The Sun makes the sky too bright.)
- Is the Sun a star? (Yes; it is the star closest to us. Accept "yes" with no reason.)

✓ Closing check (5 min, with answers)

Hold up the day picture and the night picture. "Point to the picture where we can see stars." (Night.) "Are the stars still there in the day picture?" (Yes, but the Sun's light is too bright to see them.) Answers by pointing, a thumbs up or down, or words all count.

Vocabulary

star, night, daytime, bright, dark, model

Differentiation

- Support: sort only Sun, Moon and stars.
- Stretch: explain to a partner why the torch model is like the sky.
- Early finishers: draw the same view by day and by night.

⚠ Safety

- Torches point at the floor or into the box, never into anyone's eyes.
- Darkened room: clear the floor first, keep a light on near the door, and let any child who dislikes the dark sit by the door or stay in the light; looking from the edge counts.
- Battery tea-lights only, no real candles. Battery covers screwed shut.

Access

- Blind or low-vision children use the sound model: listen for the quiet ticking timer in a silent room (easy), then while music plays at a comfortable volume (hard). The timer did not stop; the louder sound hid it, as the Sun's light hides the stars. Say that this is a model with sound, not light.
- Children who find dark spaces upsetting watch the glow stars from the door or by a window; joining in is optional.
- Non-speaking children sort cards and point; no words needed.

Teacher notes

- The assessment boundary for this standard is only that stars are seen at night and not in the day. Do not test star patterns or names.

- A few very bright planets and the Moon can sometimes be seen by day; do not use them as a "trick" question at this age.
- Some children live where city lights hide most stars; "people far from bright lights see many more" is a kind way to say it.

Lesson 5: Long days and short days

Unit overview - Previous: Lesson 4

Goal: Children compare the amount of daylight at two times of year and say that there is less daylight in winter than in spring, summer or autumn. They start a class sky diary to check this themselves later in the year.

Length: about 40 minutes.

Materials

- Two Little Hill day strips, each a long paper strip split into a row of equal boxes from "wake up" to "bed time" for one made-up child, Pip: one strip for a winter school day, one for a spring school day. Boxes are coloured yellow (light outside) or dark blue (dark outside). In the winter strip, the first boxes (getting up, breakfast) and the last boxes (going home, tea, bed) are dark blue; in the spring strip most boxes are yellow and only bed time is dark blue.
- Per pair: small copies of both strips, and a picture card set of Pip's day (wake up, breakfast, walk to school, playtime, home time, tea, bath, bed), the same for both seasons.
- Tactile strips: the yellow boxes covered in smooth paper, the dark blue ones in rough sandpaper or felt.
- Two photos the teacher took of the same view at the same clock time in the early evening (for example 5 o'clock): one taken now (winter or late autumn) and one from earlier in the year, or a drawing of the same view in spring if no photo exists.
- A large class "sky diary" sheet with one row for each week until the end of term 3. Each row is a blank day strip of equal boxes, one box for each hour from 6 in the morning to 8 in the evening (no numbers needed on the children's copy).
- Sunrise and sunset times for your town each week, from a weather service or almanac your school uses; only the teacher uses the times.
- Yellow and dark blue counters, and yellow and dark blue crayons or stickers.

Steps

✎ Opening (5 min)

Show the two window photos. "These were taken at the same time on the clock. What is different?" (One is darker.) "Why might that be?" Take ideas.

✎ Main activity (25 min)

1. Show the two big Pip strips. Read the winter one together: "When Pip wakes up, is it light or dark outside?" (Dark.) "At home time?" (Getting dark, or dark.) Then the spring strip.
2. Pairs lay their small strips one above the other. "Which strip has more yellow?" (Spring.) "Which has more dark blue?" (Winter.) Children may count boxes to check; the answer is "more" or "less", not hours.

3. Pairs use the Pip picture cards: for each card, they put a yellow or blue counter on it for winter, then for spring. "Which parts of Pip's day change?" (The early morning and the evening.)
4. Start the class sky diary: the teacher reads this week's sunrise and sunset times (to themself) and children colour this week's row, yellow for the boxes between sunrise and sunset and dark blue for the rest. The teacher helps with the box where the change happens. Each week one child colours the new row in the same way.
5. Predict together: "When we colour the row in the spring term, will it have more yellow or less?" Write the prediction on the sheet.

✓ Discussion questions (5 min, with answers)

- In winter, is there more daylight or less? (Less.)
- In spring, is there more daylight or less than in winter? (More.)
- Why were both photos taken at the same time on the clock? (So the only big difference is the time of year; if they were taken at different times of day, we could not tell whether the season made the difference.)

✓ Closing check (5 min, with answers)

Give each child the two small Pip strips without labels. "Point to the winter day." (The one with more dark blue.) "Which day has more light?" (The spring day.) Then: "What do you think our sky diary will show in spring?" (Longer yellow rows: more daylight.)

Vocabulary

daylight, winter, spring, summer, autumn, season, more, less, compare

Differentiation

- Support: compare only two picture cards, "walk to school" and "home time", for winter and spring.
- Stretch: draw Pip's strip for a summer day and say how it is different from spring.
- Early finishers: decorate the sky diary sheet border with Sun, Moon and stars.

⚠ Safety

- No one looks at the Sun when checking the sky for the diary.
- Never ask children what time they get up, go to bed, or whether they go out after dark; use Pip.

Access

- Blind or low-vision children use the tactile strips: rough boxes for dark, smooth for light. "More rough" means "more dark".

- Children with colour vision differences: the blue boxes also carry a small moon symbol and the yellow boxes a small sun symbol.
- Non-speaking children point to the strip or place counters.

Teacher notes

- In the southern hemisphere the seasons fall in different months: swap the order so the diary runs from the darker season to the lighter one, and check that "term 2" really is the winter part of your year.
- The assessment boundary for this standard is relative amounts of daylight: more or less, not hours or minutes. Counting boxes is a comparison tool, not a measurement of hours.
- Near the equator, daylight changes very little through the year; if that is your class, compare Little Hill (made-up, far from the equator) with your own diary and say "in some places it changes a lot, here it hardly changes".
- Come back to the sky diary in term 3 and compare the rows. Many school days begin and end in daylight, so the diary uses sunrise and sunset times rather than asking children to look outside before or after school.

Grade 2 Science: Solids, Liquids and Melting Ice (5 lessons, about 2-3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 4 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules.

Back to the science progression

Big idea

Materials around us can be solids or liquids. A solid keeps its own shape; a liquid flows and takes the shape of its container, with a flat top. Warming can melt a solid into a liquid, and cooling can freeze a liquid into a solid. Melting and freezing can be undone, but some changes (like cooking an egg) cannot. Some coverings slow down melting by keeping warmth out.

Outcomes

By the end of the unit a student can:

1. Sort everyday materials into solids and liquids and give a reason ("it keeps its shape", "it pours and goes flat").
2. Explain why sand or rice can be poured but is still made of solid grains, and why honey is a liquid even though it pours slowly.
3. Predict and then observe which of two places makes an ice cube melt faster, keeping everything else the same.
4. Say that melting and freezing can be undone, and give one example of a change that cannot be undone.
5. Choose a covering to keep an ice cube solid for longer, test it, and say whether the prediction was right.
6. Record observations with pictures, ticks and simple times on a class chart.

Prior knowledge

- Children have seen ice, water, rain and puddles.
- Telling the time to the half hour helps but is not needed; the teacher can call out "10 minutes" checks.
- Simple "I think... / I saw..." talk from kindergarten and grade 1 science.

Lessons

Lessons are 30-40 minutes. Lessons 3 and 5 need ice cubes from a freezer, so plan them on days when you can make ice the day before.

1. Solid or liquid? - feel, pour and sort a tray of materials.
2. Tricky materials - sand, rice, honey, playdough and shaving foam; grains versus liquids.
3. Where does ice melt fastest? - a fair test with ice cubes in a warm spot and a cool spot.
4. Can we undo it? - freezing water back to ice, melting and setting chocolate, and changes that cannot be undone.

5. Ice cube rescue - design a covering that keeps an ice cube solid for longest, then the end-of-unit check.

Materials

For a class of about 25 in groups of 4-5:

- Clear plastic cups and small tubs, spoons, trays to catch spills, paper towels, a mop or cloths.
- Solids: wooden blocks, pebbles, coins (teacher-held for younger groups), a plastic toy, a pencil, ice cubes.
- Liquids in sealed or lidded bottles: water, cooking oil, washing-up liquid (adult only), milk or juice (not for drinking).
- Tricky materials: dry sand, uncooked rice, salt, honey or golden syrup, playdough, shaving foam (optional; see Safety).
- Ice: about 3 trays of cubes made the day before, all the same size.
- Small plates or saucers (identical), a timer, class chart paper.
- Lesson 4: a small zip bag of chocolate buttons per group (check allergies; see Lesson 4), a bowl of warm tap water, an ice cube tray, the freezer.
- Lesson 5: identical small plastic cups, and coverings: kitchen foil, paper, a woollen sock or cloth, bubble wrap, cotton wool, a plain cup with no covering.

Assessment

- Lessons 1-4: listen to reasons during sorting and discussion; look at the group charts.
- Lesson 5: an 8-question end-of-unit check (16 marks) in Lesson 5. It is formative: use it to see what to revisit, not to grade children.

Sources

- Wikipedia, State of matter
- Wikipedia, Solid
- Wikipedia, Liquid
- Wikipedia, Melting
- Wikipedia, Melting point
- Wikipedia, Freezing
- Wikipedia, Ice
- Wikipedia, Water
- Wikipedia, Viscosity
- Wikipedia, Granular material
- Wikipedia, Thermal insulation
- Wikipedia, Physical change
- Wikipedia, Chemical reaction
- Wikipedia, Chocolate
- Wikipedia, Frostbite (why freezer-cold ice should not be held for long)

Known gaps and cautions

- Gases are left out on purpose. In the science progression evaporation and the water cycle come in grade 4, reversible and irreversible changes in grade 5, and the particle model of solids, liquids and gases in grades 6-8.

- "Solid" and "liquid" are simplified. Thick or odd materials (shaving foam, slime, toothpaste) do not fit neatly; the unit treats them as talking points, not as a test of right answers.
- "Can be undone" and "cannot be undone" are the words used here instead of "reversible" and "irreversible". Melting chocolate can change its texture (it may set dull or streaky), so "undone" means back to a solid, not perfect.
- Melting times depend on the room, the sun and the ice size. Compare results within one class on one day only.
- No images yet. No educator review.

Lesson 1: Solid or liquid?

Back to the unit

Goal

Children sort everyday materials into solids and liquids and give a reason: a solid keeps its own shape; a liquid pours, takes the shape of its container and has a flat top.

Materials

- Per group, on a tray: a wooden block, a pebble, a plastic toy, a pencil, a lidded bottle of water, a lidded bottle of cooking oil, a lidded bottle of milk or juice (not for drinking).
- Per group: three clear containers of different shapes (a tall cup, a wide tub, a small bowl), paper towels.
- Two sorting hoops or two large sheets labelled with a picture of a block ("solid") and a picture of a drop ("liquid").
- Class chart with two columns: "Keeps its shape" and "Pours and goes flat".

Steps

✎ Opening (5 minutes)

Hold up a wooden block and a cup of water. Ask: "If I tip these over, what happens to each one?" Tip the block onto the tray (it stays a block). Pour a little water onto a tray (it spreads out). Ask children to describe what they saw.

✎ Main activity (20 minutes)

1. Groups take each solid object and try to put it into each of the three containers. Does the object change shape to fit? (No - it stays the same.)
2. The teacher, or a careful child with the teacher holding the cup, pours the same bottle of water into the tall cup, then into the wide tub, then into the bowl. Children watch the water change shape every time.
3. Children look at the water from the side, with eyes level with the cup: the top is flat, even when the cup is tipped a little.
4. Groups place each material in the "solid" or "liquid" hoop. Each child says one reason using the sentence starter "It is a solid/liquid because it...".
5. The class fills in the chart together.

✓ Discussion questions (with example answers)

- **What did the water do when we poured it into a different cup?** It changed shape to fit the cup. It went flat on top.
- **Did the block change shape in the tall cup?** No. It stayed a block. It just sat there.

- **Is the milk a solid or a liquid? How do you know?** A liquid, because it pours and takes the shape of the bottle.
- **Can you think of a solid in our classroom? A liquid at home?** Solid: chair, book, door. Liquid: water, juice, bath water, shampoo.

✓ Closing check (5 minutes, with answers)

Show pictures or real items; children show thumbs up for solid, thumbs to the side for liquid:

1. A spoon - solid.
2. Orange juice - liquid.
3. A brick - solid.
4. Rain - liquid.
5. An ice cube - solid (it keeps its shape, for now - "we will find out more about ice soon").

Vocabulary

solid, liquid, shape, pour, flow, container

Differentiation

- **Extra support:** use only the hoops and pictures; sentence starter printed on a card; work with an adult in a small group.
- **Extra challenge:** "Is a pile of paper clips a solid or a liquid? It takes the shape of the box!" (Each clip is a solid; the pile only looks like it pours.) This leads into Lesson 2.

⚠ Safety

- Keep liquids in lidded bottles; open only for pouring, over a tray.
- No tasting or drinking any material, even milk or juice.
- Mop spills at once; wet floors are slippery.
- Cooking oil makes floors very slippery; pour it only over a tray, or keep that bottle closed and just tip it to watch.
- Small objects (coins, pebbles) can be choking hazards; count them back in.

Teacher notes and common misconceptions

- Children often say a liquid is "wet" and a solid is "hard". Accept these as starting points, but steer towards shape: soft solids (a sponge, cloth) are still solids, and some liquids (oil) do not feel "wet" in the same way.
- Some children think a liquid has no shape. It does - it borrows the shape of whatever it is in, apart from the flat top.

Lesson 2: Tricky materials

Back to the unit

Goal

Children explore materials that do not fit the solid/liquid sort easily. They learn that sand, rice and salt can be poured but are made of tiny solid grains, and that honey is a liquid even though it flows slowly.

Materials

- Per group, on a tray: a cup of dry sand, a cup of uncooked rice, a small cup of salt, a lidded jar of honey or golden syrup, a ball of playdough, two spoons, a magnifying glass, a dark sheet of card.
- Optional (teacher demonstration only): a can of plain shaving foam.
- The class chart from Lesson 1, plus a third column: "Not sure - let's talk".

Steps

✎ Opening (5 minutes)

Pour rice slowly from one cup into another. Ask: "Is rice a liquid? It pours!" Take a show of hands. Do not give the answer yet.

✎ Main activity (25 minutes)

1. **Grains.** Groups sprinkle a few grains of rice, sand and salt onto the dark card and look with the magnifying glass. Ask: does each grain keep its own shape? (Yes.) Can you press one grain and change its shape? (No.)
2. **Piles.** Groups pour sand onto the tray. Does it go flat like water? (No - it makes a heap with sloping sides.) Pour water beside it for comparison, over the tray.
3. **Slow flow.** Groups tip the closed honey jar and watch it move. Then the teacher spoons a little honey onto a plate: it slowly spreads out and goes flat. Honey is a "thick" liquid; it is slow, but it still flows and takes the shape of the plate.
4. **Squash it.** Children squash and roll playdough. It changes shape when pushed, but when you stop pushing it stays in its new shape - it does not flow by itself. It is a soft solid.
5. **Optional demonstration.** The teacher squirts a little shaving foam on a tray. Is it a solid or a liquid? Let children argue; put it in the "Not sure" column. (It is a foam, mostly gas bubbles trapped in a liquid; it is fine for it to stay "not sure".)
6. Update the class chart.

✓ Discussion questions (with example answers)

- **Rice pours. Why isn't it a liquid?** Because each grain is a tiny solid that keeps its shape. The pile makes a heap; it doesn't go flat.
- **Honey is slow. Why is it a liquid?** Because it flows by itself and goes flat on the plate, just slowly.
- **Playdough changes shape. Why is it a solid?** Because it only changes when we push it, and then it stays. It doesn't pour.
- **What would happen to sand in a cup if you looked very closely?** You'd see lots of tiny solid bits with air between them.

✓ Closing check (5 minutes, with answers)

Children answer on whiteboards with S (solid) or L (liquid):

1. Sugar - S (tiny solid grains).
2. Ketchup - L (a thick liquid; it flows slowly).
3. Flour - S (very tiny solid grains).
4. Shampoo - L.
5. A ball of clay - S.

Vocabulary

grain, heap, thick, runny, flow, soft solid

Differentiation

- **Extra support:** focus on two materials only (rice and honey) and the question "does each bit keep its shape?".
- **Extra challenge:** "Why does a big heap of sand slope at the sides but water goes flat?" Accept ideas such as "the grains lean on each other".

⚠ Safety

- No tasting. Uncooked rice and dried foods are not snacks.
- Keep sand away from faces and eyes; pour low, over trays. If sand gets in an eye, do not rub; rinse with clean water and tell an adult.
- Salt stings cuts and eyes; wash hands after the lesson.
- Check allergies before using honey, flour or playdough (playdough often contains wheat).
- Shaving foam: teacher only, plain unscented if possible; keep it away from eyes and mouths; check skin allergies before letting anyone touch it.
- Sweep up spilled sand and rice at once - they are slippery underfoot.

Teacher notes and common misconceptions

- "If it pours, it's a liquid" is the main misconception to tackle. The grain test (does each piece keep its shape?) and the heap test (does it go flat?) are the two simple checks.
- "Thick" and "runny" are fine everyday words for what scientists call viscosity. There is no need to introduce that word.
- Some materials genuinely do not fit (foams, gels, slime). Saying "scientists have extra names for these" is honest and enough at this age.

Lesson 3: Where does ice melt fastest?

Back to the unit

Goal

Children carry out a simple fair test: two identical ice cubes on identical plates, one in a warm spot and one in a cool spot. They predict, observe at regular times and say what they found. They learn that warmth makes ice melt into water.

Materials

- Ice cubes made the day before in the same tray, so they are the same size (2 per group, plus spares).
- Per group: two identical small plates or saucers, two labels ("warm" and "cool"), a recording sheet (see below), a pencil.
- A warm spot: a sunny windowsill, or a table about one metre from a heater (never on or touching the heater).
- A cool spot: a shady corner, a table by an outside wall, or a corridor.
- A timer or the classroom clock; a thermometer is optional, for the teacher to show which place is warmer.

Recording sheet: a table with rows "Start", "10 minutes", "20 minutes", "30 minutes", "40 minutes" and columns "Warm spot" and "Cool spot". In each box children draw the cube and puddle, or tick one of three pictures: "all ice", "some ice and water", "all water".

Steps

✎ Opening (5 minutes)

Show an ice cube on a plate. Ask: "Is this a solid or a liquid?" (Solid.) "What will it be like at home time?" (Water, a liquid.) Ask: "Could we make it change faster or slower?" Collect ideas.

✎ Main activity (30-40 minutes, with other work between checks)

1. Explain the fair test: "We will change only ONE thing - where the plate goes. Everything else stays the same: the same size ice cube, the same kind of plate, the same start time."
2. Each child predicts which cube will melt first by putting a sticker or name on "warm" or "cool" on a class prediction chart.
3. At the same moment, an adult puts one cube on each plate. Groups carry the "warm" plate to the warm spot and the "cool" plate to the cool spot.
4. Children draw the "Start" row.
5. Every 10 minutes, groups look (without touching the ice) and record. The class can do quiet work between checks.
6. Stop when the first cube is all water, or after 40 minutes, whichever comes first.

✓ Discussion questions (with example answers)

- **Which cube melted faster? Was your prediction right?** Usually the warm spot. "I thought warm, and I was right." It is fine to be wrong; say so.
- **Why did we use the same size ice cubes and the same plates?** So it was fair; only the place was different, so the place made the difference.
- **Where did the ice go?** It didn't disappear - it turned into water, the puddle on the plate.
- **What could you do to make ice melt even more slowly?** Put it in a colder place, or wrap it up (this leads to Lesson 5).

✓ Closing check (5 minutes, with answers)

1. What does warmth do to ice? It makes it melt into water.
2. Is the puddle a solid or a liquid? A liquid.
3. In our test, what was the one thing we changed? Where we put the plate.
4. Name one thing we kept the same. The size of the ice cube / the type of plate / the start time.

Vocabulary

melt, warm, cool, fair test, predict, observe

Differentiation

- **Extra support:** use only the three-picture tick boxes; an adult reads the time.
- **Extra challenge:** add a third plate (e.g. a metal tray in the cool spot) and ask whether the plate makes a difference. Discuss that this is a second test, because now two things could change.

⚠ Safety

- Ice straight from a freezer can stick to skin and cause a cold burn. Let cubes sit on the plate for a minute before anyone touches them, and touch only briefly.
- Ice is not for eating in class (choking risk; classroom trays and hands are not clean).
- Never put plates on or against heaters, radiators or lamps.
- Carry plates slowly and level; wipe up meltwater at once (slip risk).
- Windowsills: no climbing; an adult places and moves the plates if the sill is high.

Teacher notes and common misconceptions

- Some children think the ice "disappears" or "goes into the plate". Point to the water: the same stuff, now a liquid. You can weigh a cube in a cup before and the water after on kitchen scales if you have them: the amount is about the same.
- "Cold makes ice" is true, but "cold goes into things" is a common idea. Keep the talk about warmth: warmth from the room or the Sun goes into the ice and melts it. Coverings keep warmth out (Lesson 5).

- On a cold, cloudy day, the difference may be small. That is still a result; talk about why.

Lesson 4: Can we undo it?

Back to the unit

Goal

Children see that melting and freezing can be undone: water freezes to ice and ice melts to water; chocolate melts in warm water and sets solid again when cooled. They compare this with changes that cannot be undone, such as cooking an egg or toasting bread.

Materials

- The day before: children help pour water into an ice cube tray; the teacher puts it in the freezer. Also keep one cup of water from the same jug in the classroom, for comparison.
- Per group: a small zip-lock bag with 4-5 chocolate buttons, sealed and with the air pressed out; a bowl of warm tap water (adult-filled; it should feel comfortably warm on the back of a hand, like a bath, not hot); a paper plate; a cool place or fridge for later.
- **If any child has a milk, soy or nut allergy, or chocolate is not allowed:** use a small piece of plain ice lolly made from fruit juice instead, or keep the chocolate as a teacher-only demonstration in a sealed bag. Check your school's food policy first.
- For "cannot be undone": a raw egg (in its shell) and a hard-boiled egg cooked at home by an adult and cooled; a slice of bread and a slice of toast made before the lesson. Pictures are fine instead.
- Class chart with two columns: "Can be undone" and "Cannot be undone".

Steps

✎ Opening (5 minutes)

Take out the frozen tray. Compare the ice with the cup of water saved from yesterday. Ask: "What changed? How did it change?" (It got very cold in the freezer and turned solid.) Ask: "Can we turn it back into water?"

✎ Main activity (25 minutes)

1. **Ice back to water.** Put two of the new ice cubes on a plate in the warm spot from Lesson 3. They will melt during the lesson. Water became ice, and ice becomes water again.
2. **Chocolate.** Each group holds its sealed bag in the bowl of warm water for 3-5 minutes, keeping the top of the bag out of the water. Children watch the solid buttons go soft and runny. Ask: "Is it a solid or a liquid now?"
3. Groups lay the bags flat on a plate and squash the melted chocolate into a shape (a flat circle, a letter). The adult puts the plates in a cool place or fridge for 20-30 minutes, or until the next lesson.
4. **Cannot be undone.** While the chocolate sets, show the raw egg (crack it into a clear bowl so children see the runny inside) and the boiled egg (cut in half). Ask: "Could we turn the cooked egg back into a runny egg?" (No.) Do the same with bread and toast.

5. Check the chocolate: it is solid again, in its new shape. Fill in the class chart.

✓ Discussion questions (with example answers)

- **What made the chocolate melt?** The warm water warmed it up.
- **How did we make it solid again?** We let it cool down in a cool place or the fridge.
- **Can you un-cook an egg? Why not?** No. Cooking changed it into something new; cooling it down doesn't make it runny again.
- **Is melting ice something we can undo?** Yes - put the water in the freezer and it turns back into ice.

✓ Closing check (5 minutes, with answers)

Thumbs up for "can be undone", thumbs down for "cannot be undone":

1. Water freezing into ice - can be undone.
2. Baking a cake - cannot be undone.
3. Butter melting in a warm room - can be undone (it goes solid in the fridge).
4. Burning a piece of paper - cannot be undone (adult-only; do not demonstrate).
5. An ice lolly melting - can be undone (refreeze it, though it may look different).

Vocabulary

freeze, melt, set, cool down, warm up, can be undone, cannot be undone

Differentiation

- **Extra support:** use only ice and chocolate; ask "solid or liquid now?" at each step.
- **Extra challenge:** "When the chocolate set again, was it exactly the same as before?" (It is a solid again, but its shape is different and it may look dull or streaky.) Is it still "undone"?

⚠ Safety

- Food allergies: check every child before using chocolate, eggs, bread or butter. Follow your school's food policy.
- No eating in this lesson. Chocolate that has been handled in class is not for eating, even after it sets.
- Raw egg: adult cracks it; wash hands and surfaces after; children don't touch raw egg (Salmonella risk).
- Warm water only, filled by an adult from the warm tap. No kettles, hot plates or candles in the classroom. If the water feels hot, add cold.
- Freezer-cold ice: let it sit a minute before touching (cold burns).
- Zip bags: check seals before dipping; wipe drips at once (slip risk).
- Toast: make it before the lesson; no toaster within children's reach.

Teacher notes and common misconceptions

- In everyday speech "melting" is sometimes used for dissolving (sugar "melting" in tea). Keep "melting" for a solid turning into a liquid because it was warmed. Dissolving comes later (grade 5 in the science progression).
- Children may think the fridge "makes" the chocolate solid. A good way to say it: the fridge takes warmth away, so the chocolate cools down and sets.
- Do not use the words "reversible" or "irreversible" unless children are ready; "can be undone" is enough here.

Lesson 5: Ice cube rescue

Back to the unit

Goal

Children choose a covering they think will keep an ice cube solid for longest, test it against an uncovered cube, and compare results. They learn that some coverings slow melting by keeping warmth out. The lesson ends with the end-of-unit check.

Materials

- Ice cubes made the day before in the same tray, so they are the same size (one per group, plus one for the uncovered "control" cup and spares).
- Identical small plastic cups, one per group plus one.
- Coverings (one per group; groups can choose): kitchen foil, a sheet of paper, a woollen sock or piece of wool cloth, bubble wrap, cotton wool, a paper towel.
- Elastic bands or tape to hold coverings in place.
- A warm spot (as in Lesson 3), a timer, a class results chart.
- A copy of the end-of-unit check per child (or read aloud).

Steps

✎ Opening (5 minutes)

Tell the story: "Polar Bear Class has an ice cube, and they want it to last until lunchtime. Can we help them?" Ask what children might wrap it in. Show the coverings.

✎ Main activity (30-40 minutes, including the check while waiting)

1. Each group chooses one covering and predicts: will their cube melt faster or slower than a cube with no covering? Record the prediction on the class chart.
2. An adult puts one ice cube in each cup. Groups wrap their cup quickly with their covering, covering the top and sides. One cup stays uncovered (the control) so everyone can compare.
3. All cups go side by side in the same warm spot at the same time. Ask: "Why do they all go in the same place?" (To keep it fair - only the covering is different.)
4. While waiting, children do the end-of-unit check (below).
5. After about 30 minutes (or when the uncovered cube is mostly water), an adult unwraps each cup and the class looks. Rank the cups from "most ice left" to "least ice left" on the chart.

✓ Discussion questions (with example answers)

- **Which covering kept the most ice?** Often wool, cotton wool or bubble wrap. Results vary; say what your class found.

- **Did any covering make it melt faster than no covering?** Sometimes thin or dark coverings in strong sun do. That is a real result too.
- **Why do you think the woolly sock helped?** It keeps the warmth from the room out, so the ice warms up more slowly.
- **But we wear woolly socks to keep warm! How can wool keep ice cold?** Wool slows warmth moving through it either way: it keeps our warmth in, and it keeps the room's warmth away from the ice.

✓ End-of-unit check (8 questions, 16 marks, with answers)

Read each question aloud. Children answer by circling a picture, writing a word or drawing. Two marks each; one mark for a partly right answer. There is no pass mark: use the results to plan what to revisit.

1. Circle the two liquids: a stone, milk, a pencil, juice. **Answer:** milk, juice (1 mark each).
2. Water is poured from a tall glass into a wide bowl. What happens to its shape? **Answer:** it changes to the shape of the bowl (1) and stays flat on top (1).
3. Sand can be poured. Is sand a solid or a liquid? Why? **Answer:** solid (1) because each grain is a tiny solid that keeps its own shape (1). "It makes a heap" on its own is a good observation but not the reason; ask "what about each grain?" before giving the second mark.
4. Honey pours very slowly. Is it a solid or a liquid? **Answer:** liquid (1) because it flows and goes flat, just slowly (1).
5. Sam puts one ice cube on a sunny windowsill and one in a shady corner. Which melts first? **Answer:** the one on the sunny windowsill (2).
6. In question 5, what must Sam keep the same to make it fair? Name two things. **Answer:** any two of: the size of the ice cube, the kind of plate, the start time (1 each).
7. Can we undo melting ice? How? **Answer:** yes (1); put the water in the freezer / make it very cold (1).
8. Draw or name one change that cannot be undone. **Answer:** any of: cooking an egg, baking a cake, toasting bread, burning paper (2).

Vocabulary

covering, wrap, control, fair test, keep warmth out, melt, solid, liquid

Differentiation

- **Extra support:** give a choice of just two coverings (wool and foil); answer the check orally with an adult.
- **Extra challenge:** "Plan a second test to check whether foil works better shiny side out or shiny side in. What would you keep the same?"

⚠ Safety

- Freezer-cold ice: an adult places cubes in cups; let them sit a minute before anyone touches them.
- Ice is not for eating (choking; not clean).
- Never put cups on or against heaters or lamps.

- Wipe up meltwater at once (slip risk).
- Bubble wrap and plastic: keep away from faces; not for popping near ears or putting over heads.
- Wool and cotton wool: check for wool allergies; offer a different covering if needed.

Teacher notes and common misconceptions

- Many children (and adults) believe a woolly covering "makes heat", so they predict the ice in the sock will melt fastest. This test is a good way to challenge that: coverings slow warmth moving, they do not make warmth.
- Foil results can surprise: shiny foil reflects sunlight, so in strong sun it may do well; in a shady room it may do about the same as paper.
- If time allows, repeat the test another day. Getting the same pattern twice makes a result more trustworthy.

Grade 2 Science: Land and Water, Fast and Slow (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 11 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules.
>
> Text-checked by two other agents (Gemini 4 Carbon and Claude Haiku 5.5); see Known gaps.

Back to the grade 2 year plan - Term 2. Builds on grade 2 term 1: Solids, liquids and melting ice, grade 1 society: Maps with a key, and land and water on a globe and the science progression

Big idea

Water is found in oceans, rivers, lakes and ponds, and it can be liquid water or solid ice. We can make a model or a map to show the shapes and kinds of land and water in a place. Moving water and wind can carry soil, sand and rock from one place and drop them somewhere else, so they change the shape of the land. Some changes to the land happen very quickly; others happen so slowly that nobody could watch them happen. People design different ways to slow down water and wind, and comparing the designs helps us choose.

This is the second science unit of grade 2 (term 2). It uses solid and liquid from the term 1 unit Solids, liquids and melting ice, and maps with a key and land and water on a globe from the grade 1 society unit Maps with a key, and land and water on a globe.

Outcomes

By the end of the unit most children can:

1. Name at least three places where water is found (ocean, river, lake, pond) and say that water can be liquid or solid ice. Use a heading, a contents page or a glossary in an information book (read aloud by an adult) to find one fact.
2. Build a model of a made-up place with a hill, flat land, a river and a pond, and draw or place a map of it from above with a key.
3. Say, after watching, that moving water and wind can carry sand or soil from one place and drop it in another, and point to where it went.
4. Sort Earth events into "fast" and "slow", and give evidence from at least two sources (for example a book page and our sand model).
5. Compare at least two ways of protecting a sand hill from poured water, keeping the water the same, and say which worked better and how they know.
6. Name one way people protect real land from water or wind (for example a row of trees, plants on a slope, or a bank beside a river) and say what it protects.

Prior knowledge

- Grade 2 science term 1: solid keeps its shape, liquid flows; ice melts and water freezes.
- Grade 1 society term 3: a map shows a place from above; a key explains the symbols; on a globe, blue shows water and other colours show land.

- Kindergarten and grade 1 science: "I think... / I saw..." talk, and fair tests where only one thing changes.
- No reading is needed. The information book in lesson 1 and the source cards in lesson 4 are read aloud by an adult; every page has a picture.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week. Lesson 5 can use the grass tray only if it was sown about two weeks earlier (see Materials).

1. Where is water found?: the class information book "Water in Little Hill and far away"; contents, headings and a glossary; sorting water picture cards by place and by solid or liquid.
2. A model of Little Hill: building a hill, flat land, a river and a pond in a sand tray, then a map of the model from above with a key.
3. Water and wind move sand: pouring water on a sand hill and watching where the sand goes; an adult-only wind demonstration inside a closed clear box.
4. Fast or slow?: source cards about real changes to land (a canyon carved by a river, a rockfall, sand dunes, a glacier, an earthquake, a volcano); sorting events by fast or slow with evidence from more than one source.
5. Protect the hill: comparing ways to protect a sand hill (stones, a stick fence, a cloth, grass) with the same water poured the same way; real solutions people use; the end-of-unit check.

Materials (whole class unless noted)

- **Sand trays (lessons 2, 3 and 5):** one shallow plastic tray per group of 4-5 (a cat-litter tray or seed tray, about 30 by 40 cm), each standing in a larger tray or on a towel to catch water. Washed play sand (sold for sandpits), enough to fill each tray about 5 cm deep, kept damp. A jug of water and a small cup per group.
- **Watering cans:** one small watering can with a rose (the sprinkler head) per group, all the same size, or one shared can used by the adult.
- Small blue paper or plastic sheets (or blue playdough) for a pond, a strip of blue cling film or blue paper for a river, small sticks or lolly sticks, small stones or gravel, scraps of green cloth, paper flags for labels.
- **Lesson 1:** the class information book "Water in Little Hill and far away" (made by the teacher from the page plan in Lesson 1); twelve water picture cards (listed in Lesson 1); a globe; four place mats ("ocean", "river", "lake or pond", "on a mountain") and two mats ("liquid water", "solid ice"); a few ice cubes in a clear cup.
- **Lesson 2:** the large Little Hill map from grade 1 society, if you have it; A3 paper and crayons for each group's map; key symbol cards (hill, flat land, river, pond, trees, path).
- **Lesson 3:** the sand trays; a measuring cup (all groups use the same amount of water); one clear plastic storage box with a clip-on lid (about 40 by 30 cm) with one small hole cut in one end by an adult; a hand balloon pump or a hand-squeezed bellows (adult only); safety goggles for the adult; a cup of dry play sand for the box; paper and crayons for "before" and "after" drawings of each hill (or a camera used by the adult).
- **Lesson 4:** six source cards (listed in Lesson 4), each with a picture side and a short text side read aloud by the adult; two large sorting mats "fast" (with a hare) and "slow" (with a snail); the class information book; the groups' photos or drawings of their sand hills from lesson 3; sticky notes in two colours (or two shapes) for "a card or book says" and "our model showed".

- **Lesson 5:** per group, three identical shallow plates or small trays with a rim, a plastic "hill cup" for shaping hills, three identical clear cups for collecting sand and a small scoop; protections: small stones, lolly sticks to push in as a fence, and a square of old cotton cloth. For the whole class, one grass square on a plate (a piece of turf about 10 by 10 cm, or grass seed sown on damp sand mixed with compost in a small tray about two weeks before) and one plain sand hill beside it; a ruler or a stick to hold the watering can at the same height; the class results chart; three real-solution picture cards (a row of trees beside a field, grass and bushes on a steep bank, an earth bank beside a river).
- For blind or low-vision children: a raised-relief globe (or a globe with land and water in two textures) and a cup of water to touch; a raised-line or tactile copy of the Little Hill map from grade 1; tactile key symbols (a pebble for a hill, a piece of felt for flat land, a pipe cleaner for a river, a smooth plastic lid for a pond); real objects for each source card where possible (a stone, a handful of sand, an ice cube in a cup); the sand hills themselves to feel before and after.
- Towels, a mop or cloths, a bucket for used sand, hand-washing sinks.

⚠ Safety and access

- **Sand.** Use only washed play sand sold for children. Keep it damp so it does not make dust. No throwing sand; hands below shoulder height; wash hands after every sand lesson. If sand gets in an eye, do not rub; follow your school's first-aid rules.
- **Water and floors.** Stand trays in larger trays or on towels; mop spills at once, because wet floors are slippery.
- **Wind demonstration (lesson 3).** Adult only. The sand stays inside a closed clear box with the lid clipped on; the adult wears safety goggles and pumps air through the one small hole. Children watch from at least an arm's length away through the side of the box. Do not use a hair dryer or an electric fan near water.
- **Turf and grass.** Some children have grass or soil allergies; check first, use gloves, or let the adult handle the turf. Wash hands afterwards.
- **No balloons** (latex allergy and choking); use a hand balloon pump or a bellows without a balloon. Small stones must be too large to swallow; check your school's rules for the age group.
- **Frightening events.** Earthquakes, volcanoes, floods and landslides can hurt people and destroy homes. Some children or their families may have lived through one, or may have seen one on the news. Never ask whether a child has. Use calm pictures of land (not of injured people or damaged homes), say that grown-ups work hard to keep people safe, and let any child sit out of lesson 4's "fast" cards or do a different card. If a child becomes upset, follow your school's care routines.
- **Real water outside.** This unit never visits a real river, lake, pond or beach. If your school plans a trip, follow its own safety rules.
- Children can answer by speaking, signing, pointing, using AAC, drawing, or with a partner who writes for them. Their own way counts.
- Deaf children: show every picture while it is described, and face the class when reading aloud. Blind and low-vision children: use the tactile map, tactile symbols and real objects in Materials; describe each picture in words, and let them feel the sand hills before and after (after the water has stopped). Colour is never the only clue: water is also shown with a smooth texture and named in words.
- Wheelchair users: put sand trays on a table at a reachable height; a partner can pour while the child directs.

Assessment

Watch and listen during lessons, and use the closing checks. During lesson 5 or the following week, see each child for about 3 minutes with the cards and a small sand tray (answers in brackets):

1. Show four water picture cards (sea with waves, a river, a pond, an icy mountain top). "Where is the water in each one? Is it liquid or solid?" (Ocean or sea, river, pond, ice on a mountain; liquid, liquid, liquid, solid.) Hold up the class information book open at its glossary: "This page tells us what words mean. What is it called?" (The glossary; "word list" is fine.) (Outcome 1.)
2. Show the child a group map from lesson 2. "Point to the hill. The pond. The river. How do you know?" (Points correctly; uses the key.) (Outcome 2.)
3. Make a small damp sand hill and pour a little water on it (or show the group's lesson 3 drawing). "Where did the sand go? What moved it?" (Down the hill, to the bottom or into the tray; the water.) "What else can move sand?" (Wind.) (Outcome 3.)
4. Show two source cards: the canyon and the rockfall. "Which happened fast and which slowly? How do you know?" (Rockfall fast; canyon slowly; any evidence from the card, the book or our model, such as "the river took a very, very long time".) "Tell me a second place that helps you know." (Another source: the model, a picture, what the adult read.) (Outcome 4.)
5. "In our test, which protection kept the most sand on the hill? How do you know? What did we keep the same?" (The group's own result; less sand in the cup or the hill kept its shape; same water, same can, same height.) (Outcome 5.)
6. "Tell me one way people stop wind or water from carrying land away." (A row of trees or bushes, grass or plants on a slope, a bank or wall beside a river or the sea; and what it protects: a field, a slope, a town.) (Outcome 6.)

Record "yes", "with help" or "not yet" for each outcome. A child who can do it in their own way (pointing, signing, AAC) gets "yes".

Sources

Standards (read on 11 November 2026):

- Next Generation Science Standards, 2-ESS2 Earth's Systems:
  - 2-ESS2-1: "Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land." Clarification: "Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land."
  - 2-ESS2-2: "Develop a model to represent the shapes and kinds of land and bodies of water in an area." (The assessment boundary leaves out quantitative scaling in models.)
  - 2-ESS2-3: "Obtain information to identify where water is found on Earth and that it can be solid or liquid."
  - Core ideas: "Wind and water can change the shape of the land." "Maps show where things are located. One can map the shapes and kinds of land and water in any area." "Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form." "Because there is always more than one possible solution to a problem, it is useful to compare and test designs."

- Next Generation Science Standards, 2-ESS1 Earth's Place in the Universe:
  - 2-ESS1-1: "Use information from several sources to provide evidence that Earth events can occur quickly or slowly." Clarification: "Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly." The assessment boundary leaves out quantitative timescales, so this unit never gives years for the slow changes.
  - Core idea: "Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe."

Background for the teacher (Wikipedia, read on 11 November 2026):

- Erosion: "Erosion is the action of surface processes (such as water flow or wind) that removes soil, rock, or dissolved material from one location on the Earth's crust and then transports it to another location where it is deposited." It also says that "physical erosion proceeds the fastest on steeply sloping surfaces" and that "some mass-wasting processes act very slowly; others occur very suddenly".
- Grand Canyon: "a steep-sided canyon carved by the Colorado River in Arizona, United States".
- Landslide: "Gravity is the primary driving force for a landslide"; landslides include rockfalls and mudflows.
- Windbreak: "a planting usually made up of one or more rows of trees or shrubs planted in such a manner as to provide shelter from the wind and to protect soil from erosion. They are commonly planted in hedgerows around the edges of fields on farms."
- Levee: "an elevated ridge alongside the banks of a river, often intended to protect against flooding of the area adjoining the river. Alternatively, it is called a dike (American English)".
- Dune: "a landform composed of wind- or water-driven sand".
- Glacier: "a persistent body of natural ice ... that is constantly moving under its own weight"; "It slowly flows".
- Earthquake: "the shaking of the Earth's surface resulting from a sudden release of energy".
- Volcano: "a vent or fissure in the crust ... that allows hot lava, volcanic ash, and gases to escape".
- Ocean: "the body of salt water that covers approximately 70.8% of Earth" (the class book in lesson 1 says "most of the Earth").
- Lake, Pond ("A pond is smaller than a lake and there are no official criteria distinguishing the two") and River.

Known gaps and cautions

- One other agent (Gemini 4 Carbon, at 3f69978) text-checked this unit on 2026-11-11 and reported no content errors, plus one broken link (an anchor link to the Assessment section), since fixed. That is a text check by an AI agent, not a teacher review or classroom test.
- A second agent (Claude Haiku 5.5, at 8741363) text-checked the README and all five lessons on 2026-11-11, in two passes, and reported no errors. It checked internal consistency, facts, safety and assessment, not the quoted sources. That is also a text check by an AI agent, not a teacher review.
- The lesson order, the Little Hill stories, the information book, the source cards, the sand-tray tests and the assessment items are the author's own choices, not taken from a source.
- The sand-tray tests are comparisons in one tray on one day, not proof. Damp sand, the slope and how hard the water is poured all change the results. The grass square is a different material from the sand hills (it has roots and soil), so that comparison is not perfectly fair; lesson 5 says so to the children.

- Timings are untested guesses. With a full class of about 25 seven-year-olds, sand and water trays take real classroom-management skill: setting up, waiting turns, spills and clean-up may not fit in 40 minutes. A teacher may want an extra adult, fewer trays shown as a demonstration, or a separate clean-up slot. (Raised by a human visitor in AI Village chat, 2026-11-11.)
- "Lake or pond" is one mat in lesson 1 because, as the Pond article says, there are no official criteria separating them.
- No years or numbers are given for slow changes, following the assessment boundary of 2-ESS1-1. Children hear "a very, very long time, longer than anyone could watch".
- Volcanoes and earthquakes are named only as fast events, with calm pictures. How they happen (plates, magma) is left for later grades in the science progression.
- Wind is shown only by an adult demonstration in a closed box, not by children, so outcome 3 for wind is about watching, not testing.
- Salt water and fresh water, the water cycle and evaporation are left out here; the term 1 unit leaves evaporation for grade 4.
- No images yet.

Lesson 1: Where is water found?

Unit overview - Next: A model of Little Hill

Back to the grade 2 year plan

Goal

Children find out where water is found on Earth (ocean, rivers, lakes, ponds, ice on mountains) from an information book read aloud, use its contents page, headings and glossary, and sort pictures of water by place and by solid or liquid.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5.

Materials

- The class information book "Water in Little Hill and far away" (page plan below), made by the teacher: one large picture and one or two sentences per page.
- Twelve water picture cards (list below), drawn by the teacher or printed from photos your school may use.
- Four place mats: "ocean", "river", "lake or pond", "on a mountain".
- Two state mats: "liquid water" and "solid ice".
- A globe.
- A few ice cubes in a clear cup.
- For blind or low-vision children: a raised-relief globe or a globe with land and water in two textures; real objects for liquid and solid (a cup of water to touch, an ice cube in a cup); each picture card described aloud.

Page plan for the information book (the author's own text)

- **Cover:** "Water in Little Hill and far away".
- **Contents** (page 1): The ocean ... 2; Rivers ... 3; Lakes and ponds ... 4; Ice ... 5; Glossary ... 6.
- **Page 2, heading "The ocean":** "Most of the Earth is covered by ocean. Ocean water is salty. On a globe, the ocean is blue."
- **Page 3, heading "Rivers":** "A river is water that flows across the land, downhill, to the sea or to a lake. The river in Little Hill flows under the bridge."
- **Page 4, heading "Lakes and ponds":** "A lake is water with land all around it. A pond is a small lake. Ducks swim on the pond in Little Hill."
- **Page 5, heading "Ice":** "When water is very cold it freezes into solid ice. In winter a pond can have ice on top. On high mountains there is ice and snow all year."
- **Page 6, heading "Glossary":** ocean - the very big salty water that covers most of the Earth; river - water that flows across land; lake - water with land all around it; pond - a small lake; ice - solid water; liquid - it flows and takes the shape of its container; solid - it keeps its own shape.

The twelve water picture cards (the author's descriptions)

1. Waves on a sandy beach.
2. A ship far out at sea, with no land in sight.
3. The Little Hill river flowing under the bridge.
4. A wide river with boats on it.
5. A lake with hills all around it.
6. The Little Hill pond with ducks.
7. A pond in winter with ice on top.
8. Snow and ice on a high mountain top.
9. A glacier: a long, wide river of ice between mountains.
10. An iceberg floating in the sea.
11. A small stream running between stones.
12. A pond in a park with a path around it.

Steps

✎ Opening (5 min)

1. Hold up the cup with ice cubes. "Is this solid or liquid? What will it be by the end of the lesson?" (Solid ice now; it will melt into liquid water.) Remind the class of term 1.
2. Spin the globe. "What do you think the blue shows?" (Water.) "Is there more blue or more of the other colours?" (More blue.) "Where else is water found? Let's find out from a book."

✎ Main activity (25 min)

1. **Using the book (10 min).** Show the cover and read the title. Open the contents page: "This page is called the contents. It tells us what is in the book and where." Ask: "I want to find out about ice. Which page?" A child points to "Ice ... 5"; turn to page 5 together. Show that each page has a heading in big letters. Read pages 2 to 5 aloud, pointing to each heading first.
2. **The glossary (3 min).** Turn to page 6: "This page is a glossary. It tells us what words mean." Ask a child to choose a word; read its meaning. Ask: "Where would we look to find what 'pond' means?" (The glossary.)
3. **Sorting by place (7 min).** Give each group three picture cards. Describe each card aloud. Groups place their cards on the four place mats. Author's suggested sorting (accept other answers with a good reason): ocean 1, 2, 10; river 3, 4, 11; lake or pond 5, 6, 7, 12; on a mountain 8, 9. Card 9 can also go on "river" if a child says "it is a river of ice"; that is a good reason.
4. **Solid or liquid? (5 min).** Groups take back their cards and place them on "liquid water" or "solid ice". Cards 7 and 10 have both: ice on top and liquid water around it. Let groups put them between the mats and say why.

✓ Discussion questions (5 min, with answers)

1. "Name three places where we find water." (Any three: ocean, river, lake, pond, on a mountain, a stream, ice.)

2. "Where is the most water on Earth?" (The ocean; the book says most of the Earth is covered by ocean, and the globe is mostly blue.)
3. "Can water be solid?" (Yes, ice. Ice on mountains, on a pond in winter, icebergs.)
4. "How did we find out about ice quickly?" (We used the contents page and the heading.)

✓ Closing check (5 min, with answers)

Each child is given one picture card (or holds a real object). They say, sign or point: "Where is this water?" and "Is it liquid or solid?" (Any correct place from the sorting above; liquid or solid as sorted; "both" for cards 7 and 10.) Then point to the glossary page when asked "Which page tells us what words mean?"

Vocabulary

ocean, river, lake, pond, stream, ice, glacier, solid, liquid, contents, heading, glossary

Differentiation

- Support: sort only cards 2, 3, 6 and 8, with one clue each ("no land in sight", "under the bridge", "ducks", "high mountain").
- Extension: add a new page to the class book (draw a place with water and dictate a sentence and a heading); add one word to the glossary.
- Children can place cards by pointing, signing or AAC, or ask a partner to move them. Mats can go on a table for a wheelchair user.

⚠ Safety

- Ice cubes stay in the cup; children touch them for a few seconds only.
- Do not ask about children's holidays by the sea, swimming, or trips. Talk only about the pictures and Little Hill.

Teacher notes and misconceptions

- Children may think all water is the same. The book says ocean water is salty; leave salt and fresh water for later grades.
- Some children think a pond and a lake are different kinds of water. They are only different sizes, and even scientists do not agree on where one stops and the other begins, so the mat says "lake or pond".
- A glacier looks still in a photo but moves very slowly; this comes back in lesson 4.

Lesson 2: A model of Little Hill

Unit overview - Previous: Where is water found? - Next: Water and wind move sand

Back to the grade 2 year plan

Goal

Children build a model of a made-up place with a hill, flat land, a river and a pond in a sand tray, then make a map of the model from above with a key.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5.

Materials

- One sand tray per group of 4-5, standing in a larger tray or on a towel, with damp washed play sand about 5 cm deep.
- Small blue paper or plastic sheets (or blue playdough) for the pond; a strip of blue paper or blue cling film for the river; small sticks for trees; small stones; paper flags for labels.
- The large Little Hill map from grade 1 society, if you have it.
- A3 paper and crayons for each group's map.
- Key symbol cards: hill, flat land, river, pond, trees, path.
- For blind or low-vision children: the tactile Little Hill map from grade 1 (or a raised-line copy) and tactile key symbols (a pebble for a hill, a piece of felt for flat land, a pipe cleaner for a river, a smooth plastic lid for a pond). They can feel the sand model and place tactile symbols on a board to make their map.

Steps

✎ Opening (5 min)

1. Show the Little Hill map (or describe it). "Who remembers this? It is Little Hill from above, like a bird flying over it. What does the key tell us?" (What the symbols mean.)
2. "A map is flat. Today we will build Little Hill so it is not flat: a real hill you can touch, a river and a pond. Scientists and map-makers call this a model: a small copy that helps us think about something big."

✎ Main activity (25 min)

1. **Plan (3 min).** Each group agrees where the hill, the flat land, the river and the pond will go. The river must start near the hill and run downhill to the pond or to the edge of the tray ("the sea").
2. **Build (12 min).** Groups push damp sand into a hill (about as high as a hand is wide), smooth flat land, press a channel for the river and lay the blue strip in it, press a hollow for the pond and lay the blue sheet in it. Add sticks for trees and stones for a path if there is time. Each group puts a paper flag on each feature: hill, flat land, river, pond.

3. **Look from above (2 min).** Everyone who can stands and looks straight down; a seated child can look from a chair placed beside the tray. "What does the hill look like from above?" (A round shape, a blob.) "How can a map show it is high?" (A symbol, a colour, a word; accept any idea.)
4. **Draw the map (8 min).** Each group draws its model from above on A3 paper, with a symbol for each feature and a key in the corner using the key symbol cards as a guide. Blind and low-vision children place tactile symbols on a board to match the model.

Keep the sand trays (damp, covered with a cloth) for lesson 3.

✓ Discussion questions (5 min, with answers)

1. "What is the difference between our model and our map?" (The model is bumpy and you can touch the hill; the map is flat and seen from above.)
2. "Why does a map need a key?" (So people know what each symbol means.)
3. "Which way will the river flow?" (Downhill, from near the hill to the pond or the sea.)
4. "Is our model the same size as a real town?" (No, it is much smaller. It is a model.)

✓ Closing check (5 min, with answers)

Each group swaps maps with another group. A child from the visiting group uses the key to point to the hill, the river and the pond on the other group's map, then finds the same three things on that group's sand model. (Points correctly; any matching is fine as long as it uses the key.)

Vocabulary

model, map, key, symbol, hill, flat land, river, pond, from above, downhill

Differentiation

- Support: the adult builds the hill; the child presses the river and the pond and places flags. Maps can use stickers instead of drawn symbols.
- Extension: add a lake, an island (land with water all around it) or a valley between two hills, and add them to the key.
- A partner can build while a child directs by pointing, signing or AAC. Put the tray on a table at a reachable height for a wheelchair user.

⚠ Safety

- Washed play sand only, kept damp. No throwing; hands below shoulder height. Wash hands after the lesson.
- Small stones must be too large to swallow (check your school's rules).
- Mop any spilled water at once.

Teacher notes and misconceptions

- Children may think a map shows everything. A map shows only what the map-maker chose and put in the key.
- Some children may draw the hill from the side (a triangle). That is a useful moment: "Is that how a bird sees it?" Accept both and talk about it.
- There is no right size for the model. The standard leaves out measuring to scale at this age.

Lesson 3: Water and wind move sand

Unit overview - Previous: A model of Little Hill - Next: Fast or slow?

Back to the grade 2 year plan

Goal

Children watch water poured on their sand hill carry sand downhill and drop it at the bottom, and watch an adult show wind moving dry sand inside a closed box. They say that moving water and wind can change the shape of the land.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5.

Materials

- The groups' sand trays from lesson 2 (damp, each in a larger tray or on a towel). Take out the paper river and pond first.
- One small watering can with a rose per group (all the same), and one measuring cup so every group uses the same amount of water.
- Paper and crayons for "before" and "after" drawings (or a camera used by the adult).
- For the wind demonstration (adult only): one clear plastic storage box with a clip-on lid, with one small hole cut in one end; a cup of dry play sand heaped into a small hill in the box; a hand balloon pump or a hand-squeezed bellows (no balloon); safety goggles for the adult.
- Towels, a mop, hand-washing sinks.
- For blind or low-vision children: the sand hill to feel before and after (after the water has stopped), and a cup to feel the sand collected at the bottom.

Steps

✎ Opening (5 min)

1. Look at the models. "Last time we built Little Hill. What do you think will happen to our hill when it rains hard?" Take predictions and write them down ("It will get wet", "It will fall down", "Nothing").
2. Groups draw (or the adult photographs) their hill "before".

✎ Main activity (25 min)

1. **Rain on the hill (12 min).** Each group fills the watering can with one measuring cup of water. One child holds the can at the top of the hill, about a hand's height above it, and pours slowly through the rose; then the next child pours a second cupful. Everyone watches the side of the hill and the flat land at the bottom.

2. Ask while they watch: "Where is the water going?" (Down the hill.) "Is it carrying anything?" (Sand.) "Where is the sand stopping?" (At the bottom, on the flat land, in the river or the pond hollow.)
3. **After (3 min).** Groups draw the hill "after" (or the adult photographs it). They point to two things: a place where sand was taken away (often a small channel, or gully, down the side) and a place where sand was dropped (a fan of sand at the bottom).
4. **Wind (adult demonstration, 7 min).** Children watch from at least an arm's length away through the side of the clear box. The adult, wearing goggles, checks the lid is clipped on, then pumps air through the hole towards the small dry sand hill, gently at first and then harder. "What is the moving air doing to the sand?" (Pushing it, blowing it to the other end of the box, making the hill lower or a new shape.) Leave the lid on until the sand has settled.
5. **New word (3 min).** "When water or wind carries soil, sand or rock from one place and drops it in another, scientists call that **erosion**." Write it on the word wall with two arrows: "taken away" and "dropped".

Keep the trays for lesson 5 (smooth the sand and rebuild later).

✓ Discussion questions (5 min, with answers)

1. "Was your prediction right?" (Children compare; any honest answer.)
2. "Where did the sand go?" (Down the hill to the bottom, the flat land, the river or the pond hollow.)
3. "What moved it?" (The water. In the box, the moving air: the wind.)
4. "Where in real life might water carry sand or soil away?" (A hillside in the rain, a riverbank, a beach with waves; accept any sensible idea.)

✓ Closing check (5 min, with answers)

Show the "before" and "after" drawings (or photos) of one group's hill. Each child points to (or describes) one place where sand was taken away and one place where it was dropped, and names what moved it. (Taken away from the side or top of the hill; dropped at the bottom; the water.)

Vocabulary

erosion, carry, drop, gully, downhill, wind, predict, before, after

Differentiation

- Support: the adult pours while the child watches one spot (the bottom of the hill) and says "sand is coming" or "no sand".
- Extension: pour a third cupful from higher up, or on a steeper side of the hill, and say what changed. (Usually more sand moves on the steep side.)
- A partner can pour while a child directs. Children who cannot see the water flow feel the hill before and after, and feel the sand that collected at the bottom.

⚠ Safety

- Wind demonstration: adult only, lid clipped on, adult wears goggles, children at least an arm's length away. Never a hair dryer or an electric fan near water. No balloons.
- Keep the sand damp; no throwing; wash hands afterwards.
- Mop spills at once; wet floors are slippery.

Teacher notes and misconceptions

- Children may think the water "made" new sand. The sand at the bottom is the same sand from the hill: it was carried and dropped.
- Children may think only big floods move land. Even gentle rain moves a little; more water or a steeper slope usually moves more.
- The Erosion article on Wikipedia says physical erosion "proceeds the fastest on steeply sloping surfaces"; the extension activity lets children notice this without being told first.

Lesson 4: Fast or slow?

Unit overview - Previous: Water and wind move sand - Next: Protect the hill

Back to the grade 2 year plan

Goal

Children use information from several sources (source cards read aloud, the class book, and their own sand model) to sort changes to the land into "fast" and "slow", and give evidence from at least two sources.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5.

Materials

- Six source cards (below). Each has a calm picture on one side (land only: no injured people and no damaged homes) and the text on the other side, read aloud by the adult.
- Two large sorting mats: "fast" (a picture of a hare) and "slow" (a picture of a snail).
- The groups' "before" and "after" drawings or photos from lesson 3.
- The class information book from lesson 1 (page 5, "Ice").
- Sticky notes in two colours or two shapes: one for "a card or book says", one for "our model showed".
- For blind or low-vision children: real objects to hold for some cards (a stone for the canyon and the rockfall, a handful of dry sand in a tub for the dunes, an ice cube in a cup for the glacier); tactile mats (a smooth card for "fast", a ridged card for "slow"); each picture described aloud.

The six source cards (the author's own text, based on the Wikipedia

articles listed in the unit's Sources)

- **A. The canyon.** Picture: the Grand Canyon, a very deep valley with a river at the bottom. Text: "This is the Grand Canyon in Arizona, in the United States. A river, the Colorado River, carved it, a little at a time, over a very, very long time, longer than anyone could watch."
- **B. The rockfall.** Picture: rocks lying at the bottom of a cliff beside an empty mountain road. Text: "Rocks broke off a cliff and fell down the slope in a few seconds. A rockfall is one kind of landslide."
- **C. The sand dunes.** Picture: sand hills in a desert, with ripples on them. Text: "Wind blows sand into hills called dunes. The wind moves a little sand at a time, and a dune changes its shape slowly."
- **D. The glacier.** Picture: a glacier between two mountains. Text: "A glacier is a huge river of ice. It moves downhill, but so slowly that you cannot see it move."
- **E. The earthquake.** Picture: a long crack across an empty field. Text: "In an earthquake the ground shakes. It happens suddenly. Grown-ups who study earthquakes work hard to help people stay safe."
- **F. The volcano.** Picture: a mountain far away with a cloud of ash above it. Text: "A volcano is an opening in the ground where very hot melted rock, ash and gas come out. When a

volcano erupts, it can change the land very quickly. Grown-ups who study volcanoes watch them closely to help people stay safe."

Steps

✎ Opening (5 min)

1. Before the lesson, tell any child who might find earthquakes or volcanoes upsetting (or whose family has told you so) that they can choose cards A to D only, or help with the mats instead. Never ask a child in front of the class.
2. Show the lesson 3 drawings. "How long did it take the water to move our sand?" (A few minutes; while we watched.) "So was that fast or slow?" (Fast.) "Today we will find out about real changes to land. Some are fast and some are so slow that nobody can watch them happen."

✎ Main activity (25 min)

1. **Read the cards (10 min).** Show each card's picture, then read its text aloud. After each one ask: "Fast or slow? What words told you?" Write the clue words on the board: "a few seconds", "suddenly", "very quickly" (fast); "a little at a time", "a very, very long time", "so slowly that you cannot see it move" (slow).
2. **Sort with evidence (10 min).** Each group gets two cards (children who chose to skip cards E and F get two of A to D). Groups place each card on "fast" or "slow" and stick on a note for each piece of evidence:
    - "A card or book says..." note: the clue words on the card, or page 5 of the class book ("ice ... on high mountains all year").
    - "Our model showed..." note: for example "our water moved sand down the hill" (for the canyon or the rockfall). Each card needs evidence from at least two sources (the card plus the book, the model, or another card).
3. **Expected sorting (5 min).** Check together. Fast: B (rockfall), E (earthquake), F (volcano). Slow: A (canyon), C (dunes), D (glacier). Accept "both" for C if a child says "a big storm could move a lot of sand quickly"; that is a good reason.

✓ Discussion questions (5 min, with answers)

1. "Our water moved sand in a few minutes. Why did the river take so long to make the canyon?" (Rock is much harder than sand; the river wears it away a little at a time.)
2. "Which changes could you watch with your own eyes?" (Fast ones: a rockfall, our sand model. Not the canyon or the glacier.)
3. "How do we know about slow changes if nobody can watch them?" (People study the land and write books and make pictures; we can read and look at more than one source.)
4. "Why is it good to use more than one source?" (If two sources say the same, we can be more sure.)

✓ Closing check (5 min, with answers)

Hold up a card the child has not sorted (or describe it). The child says, signs or points "fast" or "slow" and names two places that helped them know. (As in the expected sorting; any two real sources: the card, the class book, the model, a picture.)

Vocabulary

fast, slow, sudden, canyon, rockfall, landslide, dune, glacier, earthquake, volcano, evidence, source

Differentiation

- Support: sort only B and D (rockfall and glacier) with the clue words underlined and read twice.
- Extension: put the six cards in a line from fastest to slowest and give a reason for one pair.
- Children can sort by pointing, signing or AAC, or ask a partner to place the card. Mats can go on a table for a wheelchair user.

⚠ Safety

- Use calm pictures of land only. Never show injured people, damaged homes or news footage. Never ask whether a child has been in an earthquake, a flood, a landslide or near a volcano.
- Any child can skip cards E and F with no reason given. If a child becomes upset or shares a worrying story, follow your school's care routines.
- Stones used as objects must be too large to swallow.

Teacher notes and misconceptions

- Children may think the canyon was made by one big flood. Wikipedia says the canyon was "carved by the Colorado River"; the unit says "a little at a time, over a very, very long time". The standard leaves out numbers of years at this age, and the canyon's age is still discussed by scientists, so give no number.
- Children may think "slow" means "not happening". The glacier and the dune are moving all the time, just too slowly to see.
- Volcanoes and earthquakes are named here only as fast events. How they happen is left for later grades.

Lesson 5: Protect the hill

Unit overview - Previous: Fast or slow?

Back to the grade 2 year plan

Goal

Children compare ways of protecting a sand hill from poured water, keeping the water the same for every hill, and say which worked better and how they know. They match their designs to real ways people protect land from water and wind.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. The one-to-one assessment (see Assessment in the unit overview) happens during this lesson or the following week.

Materials

- Per group: three identical shallow plates or small trays with a rim, one plastic cup for shaping hills (the "hill cup"), damp washed play sand, three identical clear cups for collecting sand, a small scoop or spoon.
- Per group: protections to choose from: small stones, lolly sticks (to push in as a fence), a square of old cotton cloth.
- For the whole class: one grass square on a plate (a piece of turf about 10 by 10 cm, or grass seed sown about two weeks earlier on damp sand mixed with compost in a small tray), and one plain sand hill beside it for comparison.
- One small watering can with a rose per group (all the same), one measuring cup, and a ruler or stick to hold the can at the same height every time.
- The class results chart (columns: hill, protection, kept its shape?, sand in the cup: a little, some or a lot).
- Three real-solution picture cards (author's descriptions): a row of trees planted along the edge of a field; grass and bushes growing on a steep bank; a long, high earth bank beside a river.
- Towels, a mop, a bucket for used sand, hand-washing sinks.
- For blind or low-vision children: hills to feel before and after (after the water has stopped); the collecting cups to feel how full they are; each picture card described aloud; real objects (a stick, a stone, the cloth, a piece of grass).

Steps

✎ Opening (5 min)

1. "In lesson 3 the water carried sand off our hill. People who live on hills and by rivers have the same problem. Today we are engineers: we will design ways to protect a hill and compare them."

2. "To compare fairly, what must be the same for every hill?" Agree together: same hill (made with the same hill cup), same sand, same water (one measuring cup), same watering can, poured from the same height. "Only the protection changes."

✎ Main activity (25 min)

1. **Make three hills (5 min).** Each group fills the hill cup with damp sand, presses it down, and turns it out onto each plate like a sandcastle: three hills the same size.
2. **Choose and add protections (5 min).** One hill gets **no protection**, so we can compare. The group chooses two protections for the other two hills: stones laid on the slope, a stick fence pushed in around the bottom or across the slope, or the cloth laid over the hill. (Across the class, try to test each one.)
3. **Pour (7 min).** For each hill in turn: one measuring cup of water in the can; the can held at the top of the ruler standing beside the hill; pour slowly through the rose until the can is empty. Everyone watches.
4. **Collect and compare (5 min).** For each hill, scoop the loose sand that washed onto the plate into a clear cup and line the three cups up. Look at each hill: did it keep its shape? Fill in the class results chart with "a little", "some" or "a lot".
5. **The grass square (3 min, adult).** The adult pours one measuring cup the same way onto the grass square and onto the plain sand hill beside it. "What did the roots do?" (Held the soil; less washed away.) Say honestly: "This one is not a perfectly fair test, because the grass square is soil and roots, not our sand. But it gives us a clue."

✓ Discussion questions (5 min, with answers)

1. "Which protection kept the most sand on the hill? How do you know?" (Each group's own result. Evidence: less sand in the cup, the hill kept its shape.)
2. "Why did we keep one hill with no protection?" (To compare; to see if the protection made any difference.)
3. "Did every group get the same result?" (Maybe not. Different groups may have poured differently, or built the fence differently. That is why engineers test more than once.)
4. Show the three real-solution cards. "Which of our designs is most like each one?" (Row of trees: a bit like the stick fence; it slows the wind across a field. Grass and bushes on a bank: like the grass square; roots hold the soil. Earth bank beside a river: like a wall or fence; it holds back the water when the river is high. Accept other good matches.)

✓ Closing check (5 min, with answers)

Each child answers one of these, by saying, signing, pointing or drawing:

- "Which protection worked better in your group, and how do you know?" (Their result, with evidence from the cups or the hill shape.)
- "What did we keep the same?" (The water, the can, the height, the hill size.)
- Pointing to a real-solution card: "What does this protect?" (The field from wind; the bank or slope from rain; the land beside the river from flooding.)

Then begin the one-to-one assessment (see Assessment in the unit overview).

Vocabulary

protect, design, engineer, compare, fair, the same, windbreak, bank, roots, result

Differentiation

- Support: compare only two hills (no protection and stones); the child says "more sand" or "less sand" for each cup.
- Extension: design a new protection from the materials (for example stones and sticks together), test it the same way, and say whether it beat the others.
- A partner can pour while a child directs. Children who cannot see the water flow feel each hill before and after, and compare how full the cups are.

⚠ Safety

- Washed play sand only, kept damp; no throwing; wash hands afterwards.
- Check for grass and soil allergies before the grass square; the adult handles it and children can wear gloves. Wash hands afterwards.
- Lolly sticks are pushed in, not thrown; stones must be too large to swallow.
- Mop spills at once; wet floors are slippery.

Teacher notes and misconceptions

- Children may say "the cloth worked best, so it is the best for real hills". A cloth over a real hill would stop plants growing. The test tells us which worked best on our sand hill, today; real engineers think about more than one thing.
- Results will vary between groups. That is expected and is a good reason to compare and test designs more than once.
- The Windbreak article on Wikipedia describes rows of trees or shrubs that "provide shelter from the wind and to protect soil from erosion", and the Levee article describes a bank beside a river (a dike in American English) that is "often intended to protect against flooding".

Grade 2 Science: Habitats, Seeds and Helpers (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 11 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules.
>
> Text-checked by three other agents (Gemini 3.8 Flash, Gemini 4 Carbon and Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 3. Builds on grade 1 science: What do plants need?, grade 2 science term 2: Land and water, fast and slow, grade 2 language and literacy term 3: Writing for a reason and the science progression

Big idea

A habitat is a place where living things find what they need. Different places near school, and different places around the world, have different kinds of living things, and some places have many more kinds than others. Plants need light and water to grow well, and we can find this out with a test where we change only one thing. Plants cannot walk, so many of them get help from animals: some seeds have hooks that catch on fur, some seeds are inside fruit that animals eat, and bees and other animals carry pollen from flower to flower. We can build models that work like these animal helpers.

This is the third science unit of grade 2 (term 3). In grade 1 the class tested four bean pots; here the children help plan the test themselves, with three pots for each choice, and say what they keep the same. The grade 2 literacy unit Writing for a reason reads fact pages about what a seed needs and how seeds get about; this unit tests those ideas.

Outcomes

By the end of the unit most children can:

1. Look for living things in two places near school, keep a tally of how many different kinds they found in each, and say which place had more kinds.
2. Compare habitat picture cards and say that different places have different living things, and that some places have more kinds than others.
3. Help plan a plant test that changes only one thing (light or water), say what stays the same and what we will watch, and say why we use more than one pot for each choice.
4. Say from our results that cress seedlings need water to start growing, and light to grow green and strong.
5. Build and test a model seed that sticks to fur, and say how it is like an animal carrying a seed to a new place.
6. Use a model to show how a bee carries pollen from one flower to another.

Prior knowledge

- Grade 1 science term 3: a seed has a tiny plant inside; plants need water and light; plants in the dark grow tall, thin and pale.

- Kindergarten science: living things need food, water and air; animals and plants live in places that give them what they need.
- Grade 2 science term 2: fair comparisons where we keep the water, the can and the height the same.
- Grade 2 mathematics: tally marks and simple bar graphs.
- No reading is needed. Picture cards and the habitat pictures are described aloud by an adult.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week. Lesson 3 must come at least five school days before lesson 5, so that the cress has time to grow, and the watered pots need a short daily check (about 2 minutes) by an adult and a helper.

1. Who lives here?: a habitat hunt in two places near school (for example short mown grass and a flower bed or hedge edge); a tally of how many different kinds of living things each group finds; comparing the two places.
2. Many places to live: five habitat picture cards (a pond, a wood, a rock pool, a sandy desert and a paved car park); counting the kinds in each picture; making a class bar graph; why a place might have more kinds.
3. Planning a fair plant test: asking "Does cress need light?" and "Does cress need water?"; choosing what to change and what to keep the same; setting up three pots for each choice; predictions.
4. Seeds that hitch a ride: how animals carry seeds (hooks on fur, fruit that animals eat, nuts that squirrels hide); building model seeds and testing which ones a "fur coat" carries across the room; the story of how hook seeds gave someone the idea for hook-and-loop fasteners.
5. Pollen helpers and our results: looking at the cress results; a model bee carrying "pollen" (washable ink) from flower to flower; the end-of-unit check.

Materials (whole class unless noted)

- **Lesson 1:** for each group of 4-5, a hoop or a loop of rope about 1 m across, a clipboard with the tally sheet (one column for each place, with rows "plants" and "animals"), a pencil and a magnifying glass; two places near school chosen and checked by the teacher beforehand; sun hats and water bottles if it is sunny; a whistle or bell for gathering.
- **Lesson 2:** five A4 habitat picture cards (listed in Lesson 2), drawn or printed by the teacher; a large class bar graph with five columns; sticky squares; the groups' tally sheets from lesson 1.
- **Lesson 3:** a packet of cress seeds; twelve small clear plastic pots (for example yoghurt pots, washed), plus a few spares; cotton wool; a teaspoon; a jug of water; labels and a marker; one large cardboard box that closes (the "dark box"); a sunny windowsill or a bright table; the class plan chart ("We change... / We keep the same... / We will watch..."); a prediction chart with two columns ("I think..." and "We saw...").
- **Lesson 4:** three seed picture cards (a burdock burr caught in a dog's fur, a blackbird eating a berry, a squirrel burying an acorn); for each group, twelve paper balls about 2 cm across (scrunched scrap paper, the "seeds"), seven short strips of the hook side of a hook-and-loop fastener, eight short pipe cleaner pieces (about 4 cm, cut by an adult, with the cut ends folded over), masking tape, and a shallow tray; one fake-fur mitten or a fluffy sock for the adult's hand (the "fur coat"); a "new field" mat (a sheet or a hoop) about 3 m from the trays; a class results chart; one real hook-and-loop fastener to pass round.

- **Lesson 5:** the cress pots from lesson 3; a ruler; for each group, two paper flowers (each a paper plate with a paper cup centre), one with a yellow washable ink pad in its centre (the "pollen flower") and one with a plain white paper centre; one cotton-wool "bee" on a lolly stick per child (or one per pair); aprons; wipes; the end-of-unit check cards.
- For blind or low-vision children: tactile habitat cards (felt, sandpaper, smooth plastic and bark-like card for each habitat), a seed model they can feel before and after the fur test, a real burr-like fastener to feel, and a pot of cress to touch gently at the end (dry cotton wool versus soft green shoots).
- Hand-washing sinks, paper towels.

⚠ Safety and access

- **Outside (lesson 1).** Use only places the teacher has walked through first for hazards (broken glass, dog mess, nettles or other stinging or poisonous plants, fungi, holes). Agree the boundary and the gathering signal before going out. Hats, sun cream and water as your school requires.
- **Living things.** Look, do not touch. Children do not pick plants or lift stones or logs; if the teacher lifts a log or stone, they put it back gently the same way up. Nothing is taken back to class. If a bee or wasp comes close, stay still or walk slowly away; check care plans for sting allergies and take any prescribed medicine outside, as your school's rules require.
- **Allergies.** Check for grass, pollen, plant and fur allergies before lessons 1, 4 and 5. The "fur coat" is fake fur, worn only by the adult.
- **Seeds.** The adult holds the seed packet and sprinkles the cress seeds. Seeds never go in mouths, noses or ears, and nobody eats the cress grown in class. Wash hands after handling pots and cotton wool.
- **Nuts.** Lesson 4 shows a squirrel and an acorn only as a picture card. No real nuts or acorns come into class.
- **Ink (lesson 5).** Use a washable, non-toxic ink pad; aprons on; wipes ready.
- **Small parts.** Paper balls, pipe cleaners and fastener strips stay on the table; pipe cleaner ends are folded over by an adult so no sharp end shows.
- Children can answer by speaking, signing, pointing, using AAC, drawing, or with a partner who writes for them. Their own way counts.
- Children who are afraid of insects can be the group's tally-keeper or "spotter" from a few steps back.
- Deaf children: show every picture while it is described; face the class when reading aloud; agree a visual gathering signal (a raised hand or a flag) for outside. Blind and low-vision children: use the tactile cards and real objects in Materials; in lesson 1 they can count kinds of things they can touch safely (bark, grass, leaves the teacher has checked) and kinds of bird or insect sounds they hear. Colour is never the only clue: the pale cress is also shorter-leaved and floppy, and the ink "pollen" can be felt as slightly damp.
- Wheelchair users: choose habitat places with a firm, level path; a hoop can be placed at the edge of a path. A partner can do the fur test while the child directs.

Assessment

Watch and listen during lessons, and use the closing checks. During lesson 5 or the following week, see each child for about 3 minutes with the cards, a seed model and two cress pots (answers in brackets):

1. Show the child their group's tally sheet from lesson 1. "Which place had more kinds of living things? How do you know?" (The place with more tally marks; "we counted more".) (Outcome 1.)
2. Show the pond card and the car park card from lesson 2. "Which picture has more kinds of living things? Why might a place have more kinds?" (The pond; any sensible reason such as "more water", "more plants to eat", "more places to hide".) (Outcome 2.)
3. "In our light test, what did we change? What did we keep the same? Why did we use three pots and not one?" (Light or dark; the same water, the same seeds, the same pots; so that one pot that goes wrong does not fool us.) (Outcome 3.)
4. Show one pot from the window and one pot from the dark box, then one watered pot and one dry pot (or photos). "What does cress need? How do you know?" (Light, because the dark box cress is pale and floppy; water, because the dry seeds did not grow.) (Outcome 4.)
5. Show a plain paper seed and a paper seed with hook strips. "Which seed would a dog carry to a new place? Why?" (The hook seed; the hooks catch on the fur, like a burr.) (Outcome 5.)
6. Give the child a cotton-wool bee and the two paper flowers. "Show me how the bee helps the flower." (Touches the pollen flower, then the white flower, and points to the yellow mark.) "What did the bee carry?" (Pollen.) (Outcome 6.)

Sources

Quoted exactly; the unit is not a full alignment to these standards.

- Next Generation Science Standards, grade 2, Interdependent Relationships in Ecosystems: https://www.nextgenscience.org/topic-arrangement/2interdependent-relationships-ecosystems
  - 2-LS2-1: "Plan and conduct an investigation to determine if plants need sunlight and water to grow." Assessment boundary: "Assessment is limited to testing one variable at a time."
  - 2-LS2-2: "Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants."
  - 2-LS4-1: "Make observations of plants and animals to compare the diversity of life in different habitats." Clarification statement: "Emphasis is on the diversity of living things in each of a variety of different habitats." Assessment boundary: "Assessment does not include specific animal and plant names in specific habitats."
- Wikipedia (lead paragraphs and the animal section of Seed dispersal, read 2026-11-11):
  - Habitat: "Fresh-water habitat types include marshes, streams, rivers, lakes, and ponds"; "The habitat of a species is not necessarily found in a geographical area, it can be the interior of a stem, a rotten log, a rock or a clump of moss".
  - Seed dispersal: "Seeds can be transported on the outside of vertebrate animals (mostly mammals)"; such plants "can have a variety of adaptations for dispersal, including adhesive mucus, and a variety of hooks, spines and barbs"; "Seed dispersal via ingestion and defecation by vertebrate animals (mostly birds and mammals), or endozoochory, is the dispersal mechanism for most tree species"; "Seed predators, which include many rodents (such as squirrels) and some birds (such as jays) may

also disperse seeds by hoarding the seeds in hidden caches ... if left uneaten will grow into new plants."
    - Burdock: "Burdock's clinging properties, in addition to providing an excellent mechanism for seed dispersal, led to the invention of velcro."
    - Hook-and-loop fastener: "The original hook-and-loop fastener was conceived in 1941 by Swiss engineer George de Mestral"; "He took a close look at the burs of burdock that kept sticking to his clothes and his dog's fur."
    - Pollination: "Pollinating agents can be animals such as insects, for example bees, beetles or butterflies; birds, and bats; water; wind"; "Pollinating animals travel from plant to plant carrying pollen on their bodies".
    - Cress: "a fast-growing, edible herb".
    - Etiolation: plants grown without light have "long, weak stems; smaller leaves due to longer internodes; and a pale yellow color".

Known gaps and cautions

- One other agent (Gemini 3.8 Flash, at e5ce5d4) text-checked this unit on 2026-11-11 and reported no errors. A second agent (Gemini 4 Carbon, at 625c0f9) text-checked it the same day against the NGSS and Wikipedia sources and reported one catch: lesson 4 did not give each group enough hook strips and pipe cleaner pieces for every round, since fixed. A third agent (Gemini 4 Argon, at 961572c, after the fix) text-checked timings, counts, quotes and links and reported no errors. Those are text checks by AI agents, not a teacher review or classroom test.
- The lesson order, the habitat picture cards and their counts, the seed and bee models, the plant test plan and the assessment items are the author's own choices, not taken from a source.
- The habitat picture cards are made-up pictures. Their counts say how many kinds are drawn in our pictures, not how many live in real ponds, woods or deserts. Real deserts and car parks can have more living things than the pictures show.
- Following the 2-LS4-1 assessment boundary, children are never assessed on plant or animal names; they count "different kinds" by how they look.
- Grade 1 term 3 science already tested what plants need. This unit repeats the question on purpose, but the children plan the test, use three pots for each choice and test one change at a time. Some children may remember the answer; the teacher can say "Let's see if a fairer test agrees."
- Cress usually sprouts within a few days in a warm room, but a cold room can slow it. Plant spare pots. Three pots for each choice is still a small test, not proof; the dark box may also be warmer or cooler than the windowsill.
- The fur test and the bee model are models: they show one way an animal carries seeds or pollen, not everything that happens. Real pollination also needs the pollen to reach the right part of the flower, which is left for later grades in the science progression.
- Seeds carried inside animals are mentioned only as "the seed drops out somewhere else", in a picture card, not tested.
- The habitat hunt depends on the school grounds and the season (the year plan puts it in spring). In winter or in a school with no green space, use a planted pot or tray in class and the lesson 2 cards.
- Timings are untested guesses. Going outside with a full class of about 25 seven-year-olds takes time; lesson 1 may need extra adults or a longer slot.
- No images yet.

Lesson 1: Who lives here?

Unit overview - Next: Many places to live

Back to the grade 2 year plan

Goal

Children look for living things in two different places near school, keep a tally of how many different kinds of plants and animals they find in each, and compare the two places.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5.

Materials

- For each group of 4-5: a hoop or a loop of rope about 1 m across, a clipboard with the tally sheet, a pencil and a magnifying glass.
- The tally sheet: two columns, "Place A" and "Place B", and two rows, "plants" and "animals". Children make one tally mark for each new kind they find, and may draw a tiny picture of each kind beside the tally.
- Two places near school, chosen and walked through by the teacher beforehand. Good pairs are very different, for example short mown grass and a flower bed, a hedge edge or an unmown corner. A paved yard with a few weeds in the cracks also works as one of the two places.
- A whistle or bell, or a raised flag for the gathering signal.
- Sun hats and water bottles if it is sunny.
- For blind or low-vision children: a partner who describes what they see, and safe things to touch that the teacher has checked (bark, grass, a leaf still on its plant).

Steps

✎ Opening (5 min)

Show the class the two places on the school map or by pointing from the door. Say: "A **habitat** is a place where a living thing finds what it needs: food, water, shelter and space. Today we are habitat detectives. We will not find out the names of things. We will count how many **different kinds** of living things live in each place."

Model the tally on the board: "If I see one ant, I make one mark for ants. If I see ten more ants, I do not make more marks, because they are the same kind. If I see a beetle, that is a new kind, so I make a new mark." Agree the rules: look, do not touch; do not pick; stay inside the boundary; come back at the signal.

✎ Main activity (25 min)

- **Place A (10 min).** Each group puts its hoop down where the teacher shows. Children look inside the hoop, then around it, using the magnifying glass, and make one tally mark for each new kind of plant and each new kind of animal. Different-looking leaves count as different kinds of plant. Remind them to look low: under leaves, in cracks, on stems.
- **Move (3 min).** Signal, gather, walk together to place B.
- **Place B (10 min).** The same: hoop down, look, tally.
- **Back together (2 min).** Gather in the shade or go back to class.

The teacher may lift one stone or log in each place for the class to look under, then put it back gently the same way up.

✓ Discussion questions (5 min, with answers)

- "Which place had more kinds of living things?" (Usually the flower bed, hedge or unmown corner; any answer that matches the group's tally.)
- "How do you know?" (We made more tally marks there.)
- "Why do you think one place had more kinds?" (More plants, more places to hide, more food, damper soil, fewer feet walking on it; any sensible reason.)
- "Did every group find the same number? Why not?" (No; groups looked in different spots, and some animals moved away or hid.)

✓ Closing check (5 min, with answers)

Each child shows with fingers, or points on the tally sheet:

1. "How many different kinds did your group find in place A?" (Their own count.)
2. "In place B?" (Their own count.)
3. "Which place had more kinds?" (The place with the bigger number.)

Vocabulary

habitat, living thing, kind, tally, compare, more, fewer

Differentiation

- **More help:** count only plants, or only animals; an adult points out where to look.
- **More challenge:** count how many of one kind they can see (for example "about 10 ants") as well as how many kinds; or add a third place.
- Children who are afraid of insects can be the group's tally-keeper or spotter, standing a few steps back.

⚠ Safety

- The teacher walks both places first for hazards (glass, dog mess, nettles or other stinging or poisonous plants, fungi, holes).
- Look, do not touch; no picking; no lifting stones or logs (adult only); wash hands when back in class.
- Bees and wasps: stay still or walk slowly away. Check care plans for sting allergies.
- Sun hats, sun cream and water as your school requires. Keep a clear gathering signal that every child can see or hear.

Teacher notes and misconceptions

- Some children think only animals count as "living things". Point out that grass, weeds and trees are living things too.
- Children may count the same kind twice (two snails = two kinds). Model it again: same kind, one mark.
- A place with lots of one kind (a lawn full of grass) can still have few kinds. That difference is the point of the lesson.
- The numbers are the class's own observations on one day, not a measure of the whole place; animals hide, move and come out at other times.
- If you cannot go outside, use photos of two places near school taken by an adult, count kinds in the photos together, then move straight to lesson 2.

Lesson 2: Many places to live

Unit overview - Previous: Who lives here? - Next: Planning a fair plant test

Back to the grade 2 year plan

Goal

Children compare five habitat pictures, count how many different kinds of living things are drawn in each, show the counts on a class bar graph, and say why some places might have more kinds than others.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5.

Materials

- Five A4 habitat picture cards (list below), drawn or printed by the teacher. Each kind is drawn once or more, but children count kinds, not animals.
- A large class bar graph with five columns (pond, wood, rock pool, desert, car park) and sticky squares.
- The groups' tally sheets from lesson 1.
- For blind or low-vision children: tactile versions of the cards, with one small raised shape or texture for each kind, and each card described aloud.

The five habitat picture cards (the author's own pictures)

The names in brackets are for the teacher only. Children are not asked to learn or say them.

- **Card 1, "Duck's pond in Little Hill" (8 kinds):** (a duck, a frog, a dragonfly, a water lily, reeds, a pond snail, a small fish, grass on the bank).
- **Card 2, "Little Hill wood" (9 kinds):** (a tall tree, a fern, moss on a log, bluebells, ivy, a squirrel, an owl, a beetle, a woodlouse).
- **Card 3, "A rock pool by the sea" (6 kinds):** (a crab, seaweed, a limpet, a starfish, a small fish, a sea anemone).
- **Card 4, "A sandy desert" (4 kinds):** (a cactus, a small bush, a lizard, a beetle).
- **Card 5, "The car park behind the market" (3 kinds):** (a pigeon, a weed growing in a crack, an ant).

Steps

✎ Opening (5 min)

Look again at the lesson 1 tally sheets. "Last time, one place had more kinds than the other. Today we visit five more places, in pictures. Some are near Little Hill and some are far away."

✎ Main activity (25 min)

- **Look and count (15 min).** Groups of 4-5 get one card each, then swap after 3 minutes until every group has seen every card (or show each card on a screen for the whole class). For each card, children point to each different kind of living thing and count them together. Remind them: "Same kind, count once."
- **Bar graph (10 min).** Each group sticks one square per kind for the card they counted last, then the class checks every column together. The teacher fixes any column that does not match the agreed count.

✓ Discussion questions (5 min, with answers)

- "Which picture has the most kinds?" (The wood, 9.) "The fewest?" (The car park, 3.)
- "How many more kinds are in the pond picture than in the desert picture?" (8 - 4 = 4 more.)
- "Why might the wood or the pond have more kinds than the car park?" (More plants for food, more water, more places to hide and live; the car park is mostly hard ground.)
- "Are these the real numbers for every pond and every desert?" (No; these are our pictures. Real places can have many more living things, some too small to see.)

✓ Closing check (5 min, with answers)

Point to the bar graph:

1. "Which column is tallest?" (The wood.)
2. "Which has more kinds, the rock pool or the desert?" (The rock pool.)
3. "Point to the place most like our place B from last lesson." (Any sensible choice with a reason.)

Vocabulary

habitat, kind, pond, wood, desert, rock pool, bar graph, most, fewest

Differentiation

- **More help:** count with a counter on each kind; use only three cards.
- **More challenge:** compare two columns with "how many more"; draw a sixth card for another kind of place (for example a park or a field), with the kinds they think they might find.
- Children who find counting busy pictures hard can use the tactile or a larger, clearer copy of each card.

⚠ Safety

- No special hazards. If children talk about wild animals that can hurt people (for example in the desert), say that the animals in our pictures are not dangerous to look at in a picture, and that real wild animals should always be left alone.

Teacher notes and misconceptions

- The 2-LS4-1 assessment boundary says children are not assessed on specific plant and animal names. Use the names only if children ask.
- Children may think deserts have no life at all. The desert card shows that some plants and animals do live there.
- Some children think a car park is not a habitat. Point out that the pigeon, the weed and the ant find what they need there.
- These are made-up pictures, so their numbers show only what is drawn.

Lesson 3: Planning a fair plant test

Unit overview - Previous: Many places to live - Next: Seeds that hitch a ride

Back to the grade 2 year plan

Goal

Children help plan two plant tests, each changing only one thing (light or water), say what stays the same and what they will watch, and set up three pots for each choice.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5.

Materials

- A packet of cress seeds (held by the adult).
- Twelve small clear plastic pots (for example washed yoghurt pots), plus a few spares; cotton wool, a teaspoon, a jug of water.
- Labels and a marker.
- One large cardboard box that closes (the "dark box").
- A sunny windowsill or a bright table.
- The class plan chart, with three rows: "We change...", "We keep the same...", "We will watch...".
- The prediction chart, with two columns: "I think..." and "We saw..." (the second column is filled in during lesson 5).
- For blind or low-vision children: a pot of dry cotton wool and a pot of damp cotton wool to feel; the seeds described as "tiny, like grains of sand".

Steps

✎ Opening (5 min)

Remind the class of the grade 1 bean pots: "In grade 1 we found that plants need water and light. Today we plan a better test, with **cress**, a small plant that grows fast. We ask two questions: Does cress need **light**? Does cress need **water**?"

✎ Main activity (25 min)

- **Plan the light test together (8 min).** Ask: "What will we change?" (Light or dark: some pots on the windowsill, some in the dark box.) "What must stay the same?" (The same pots, the same cotton wool, the same amount of seeds, the same water each day, the same room.) "What will we watch?" (Do the seeds grow? How tall? What colour?) Write the answers on the plan chart.
- **Plan the water test (5 min).** Children say it themselves: "We change... (water or no water). We keep the same... (pots, seeds, cotton wool, all on the windowsill). We watch... (do the seeds grow?)."

- **Why three pots? (2 min).** "What if one pot gets knocked over, or its seeds are bad? With three pots, one pot that goes wrong does not fool us."
- **Set up (10 min).** In groups, children push cotton wool into the pots and label them: "light 1, 2, 3", "dark 1, 2, 3", "water 1, 2, 3", "no water 1, 2, 3". The adult wets the cotton wool in the nine pots that get water (four teaspoons each) and sprinkles a small pinch of seeds evenly onto every pot. The three "no water" pots get dry cotton wool and seeds only. Put the "light" and both water-test sets on the windowsill and the "dark" set in the closed box in the same room.

Daily check (about 2 minutes, by an adult and a helper): give each of the nine watered pots four teaspoons of water so the cotton wool stays damp; give the "no water" pots none. Open the dark box only for the check, then close it.

✓ Discussion questions (5 min, with answers)

- "In the light test, which pots get water?" (All of them, the same amount.) "Why?" (So only the light changes.)
- "In the water test, why are all the pots on the windowsill?" (So only the water changes.)
- "What would go wrong if the dark pots got no water?" (We would not know if light or water made the difference.)

✓ Closing check (5 min, with answers)

Each child puts a sticker or a mark on the prediction chart:

1. "What will the dark box cress look like?" (Any prediction; there is no wrong prediction.)
2. "Will the no-water seeds grow?" (Any prediction.)
3. "Tell your partner one thing we keep the same." (Pots, seeds, cotton wool, room, amount of water.)

Vocabulary

cress, test, change, keep the same, predict, light, dark, damp

Differentiation

- **More help:** plan only the light test; use picture cards for "change" and "keep the same".
- **More challenge:** suggest a third test (for example warm and cold) and say what would stay the same; it is not set up here.
- A child who cannot handle pots can label, count the cotton wool pieces or be the "checker" who reads the plan chart back.

⚠ Safety

- The adult holds the seed packet and sprinkles the seeds. Seeds never go in mouths, noses or ears.
- Nobody eats the cress grown in class.

- Wash hands after handling pots and cotton wool. Wipe up spills at once.

Teacher notes and misconceptions

- Seeds can start to grow in the dark, because they do not need light to sprout; what changes is how the seedlings grow. Dark-grown seedlings are usually tall, thin, floppy and pale yellow (see Etiolation in the unit Sources). Expect children to be surprised that the dark seeds grew at all.
- Some children think more water is always better. Four teaspoons a day keeps the cotton wool damp, not flooded.
- Cress usually sprouts within a few days in a warm room; a cold room is slower. Plant one or two spare pots of each kind in case some fail.
- Three pots for each choice is still a small test, not proof. The dark box may also be a little warmer or cooler than the windowsill.

Lesson 4: Seeds that hitch a ride

Unit overview - Previous: Planning a fair plant test - Next: Pollen helpers and our results

Back to the grade 2 year plan

Goal

Children learn three ways animals help seeds get to new places, then build model seeds and test which ones a "fur coat" carries across the room, so that their model works like an animal carrying a seed.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5.

Materials

- Three seed picture cards (the author's own pictures):
  - **Card A:** a burr with tiny hooks caught in a dog's fur.
  - **Card B:** a blackbird eating a berry; a small picture beside it of a seed on the ground far away.
  - **Card C:** a squirrel burying an acorn; a small picture beside it of a young oak growing in the same spot later.
- For each group of 4-5: twelve paper balls about 2 cm across (scrunched scrap paper, the "seeds"), seven short strips of the hook side of a hook-and-loop fastener, eight short pipe cleaner pieces (about 4 cm, cut by an adult, with the cut ends folded over), masking tape and a shallow tray. That is enough for three hook strip seeds, three pipe cleaner seeds, three seeds of the group's own design and one improved seed.
- One fake-fur mitten or a fluffy sock for the adult's hand (the "fur coat").
- A "new field" mat (a sheet or a hoop) about 3 m from the trays.
- A class results chart with four rows: "plain", "hook strip", "pipe cleaner hooks", "our own idea".
- One real hook-and-loop fastener to pass round.
- For blind or low-vision children: a burr-like fastener strip and a piece of fake fur to feel; their own seed models to feel before and after the test.

Steps

✎ Opening (5 min)

Quick look at the cress pots (2 minutes): "Has anything happened yet?" Do not explain the results yet.

Then: "Plants cannot walk. So how do their seeds get to a new place where there is room to grow?" Show the three cards and read them:

- Card A: "Some seeds have tiny **hooks**. They catch on an animal's fur. When the animal walks away, the seed goes too, and later it falls off."

- Card B: "Some seeds are inside fruit. A bird or another animal eats the fruit, and the seed drops out somewhere else."
- Card C: "Some animals, like squirrels, hide nuts to eat later. If they forget one, it can grow into a new tree."

✎ Main activity (25 min)

- **Make the seeds (8 min).** Each group makes three of each kind on its tray: three plain paper balls; three with a hook strip taped round them; three with pipe cleaner pieces taped on and bent into hooks; and three of their own design using the same materials.
- **Test (12 min).** The adult with the "fur coat" visits each tray in turn and does the same thing every time: brushes the fur once, gently, across the tray; walks to the "new field" mat; and gives one gentle shake over it. The group counts how many of each kind landed on the mat, and how many are still stuck to the fur (the adult picks those off over the mat and they count as carried). Record on the results chart.
- **Improve (5 min).** Groups change one of their plain seeds to make it stick better, and the adult tests it once more.

Pass round the real hook-and-loop fastener: "About 85 years ago, a man called George de Mestral looked closely at burrs stuck to his clothes and his dog's fur. He saw tiny hooks and used the idea to make this fastener."

✓ Discussion questions (5 min, with answers)

- "Which seeds did the fur carry best?" (Usually the hook strip or pipe cleaner seeds.) "Why?" (The hooks catch on the fur.)
- "Which seeds stayed behind?" (Usually the plain ones.) "What does a plant get from a seed that travels?" (A new place to grow, with room and light.)
- "What did we keep the same in our test?" (One brush, the same mitten, the same walk, one shake.)
- "How is our model like a real animal? How is it different?" (Like: the fur carries hooked seeds to a new place. Different: a real animal walks further, and the seed falls off at a time we cannot choose.)

✓ Closing check (5 min, with answers)

1. Hold up a plain seed and a hook seed. "Which would a dog carry?" (The hook seed.)
2. "Name one other way an animal helps a seed get somewhere new." (Eats the fruit and the seed drops out somewhere else; hides a nut and forgets it.)
3. "What gave someone the idea for this fastener?" (Burrs with hooks.)

Vocabulary

seed, hook, fur, burr, carry, model, new place

Differentiation

- **More help:** test only plain and hook strip seeds; count with counters.
- **More challenge:** draw and label a design for a seed that a bird would carry inside a fruit, or one that sticks to feathers.
- Children with weak hand grip can direct a partner who tapes the hooks on.

⚠ Safety

- No real burrs, nuts or acorns in class (nut allergies and choking).
- Paper balls, fastener strips and pipe cleaners stay on the table; pipe cleaner ends are folded over by an adult.
- The fur mitten is fake fur, worn only by the adult; check for children who dislike the feel of fur and let them watch instead.

Teacher notes and misconceptions

- "Seeds only travel by wind" is a common idea. This lesson adds animals; wind and water were covered in the grade 2 literacy fact page "How Seeds Get About".
- Children may think animals carry seeds on purpose. The dog does not mean to carry the burr; the squirrel means to eat the nut later.
- The "85 years ago" is rounded from 1941 (see the unit Sources); say "a long time ago" if your class has not met large numbers.
- The model test is one comparison on one day, not proof. Fur, speed and how hard the adult shakes all change the results, so the adult keeps those the same.

Lesson 5: Pollen helpers and our results

Unit overview - Previous: Seeds that hitch a ride

Back to the grade 2 year plan

Goal

Children look at the results of the cress tests and say what cress needs, then use a model bee to show how an animal carries pollen from one flower to another.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach this lesson at least five school days after lesson 3.

Materials

- The twelve cress pots from lesson 3 (and any spares), a ruler, the plan chart and the prediction chart.
- For each group of 4-5: two paper flowers, each a paper plate with a paper cup centre. One has a yellow washable ink pad in its cup (the "pollen flower"); the other has a plain white paper circle in its cup.
- One cotton-wool "bee" on a lolly stick per child (or one per pair).
- Aprons and wipes.
- The end-of-unit check cards (see Assessment in the unit overview).
- For blind or low-vision children: the cress pots to touch gently (dry cotton wool, soft green shoots, floppy pale shoots); the ink "pollen" can be felt as slightly damp on the white paper.

Steps

✎ Opening (5 min)

Bring out all twelve pots and the dark box. Open the box last, so everyone sees the dark cress at the same moment. "Look at the plan chart. What did we change? What did we keep the same?"

✎ Main activity (25 min)

- **Our results (10 min).** Compare the sets, three pots at a time:
  - Light and dark: "What colour is each set? Which is taller? Which is stronger?" (The light set is usually green and upright; the dark set usually pale yellow, taller, thin and floppy.) An adult measures the tallest shoot in one pot of each set with the ruler.
  - Water and no water: "Did the dry seeds grow?" (Usually not; they look the same as on the first day.)
  - Fill in "We saw..." on the prediction chart. "Did all three pots in a set do the same? If one was different, what might have happened?"

- **Bee helpers (15 min).** Read: "Flowers make a fine dust called **pollen**. Bees and other animals visit flowers for food, and pollen sticks to their bodies. When they visit the next flower, some pollen rubs off. Pollen moving from flower to flower helps many plants make seeds." Each child makes their bee "visit" the pollen flower (dab the cotton wool on the ink pad), then "fly" to the white flower and land on it. Look: the yellow has moved. Groups try three more visits and count how many yellow marks the white flower gets.

✓ Discussion questions (5 min, with answers)

- "What does cress need to grow green and strong?" (Light.) "To start growing?" (Water.) "How do we know?" (Our results: the dark cress was pale and floppy; the dry seeds did not grow.)
- "Why was it a good idea to change only one thing in each test?" (So we know what made the difference.)
- "What did the bee carry? Where from, and where to?" (Pollen, from one flower to another.)
- "How is our bee like a real bee? How is it different?" (Like: pollen sticks to it and rubs off on the next flower. Different: a real bee is looking for food and visits many flowers; real pollen is dust, not ink.)

✓ Closing check (5 min, with answers)

1. "Tell your partner one thing cress needs, and how we know." (Light or water, with a result.)
2. "Show me with your bee how a bee helps a flower." (From the pollen flower to the white flower.)
3. "Name one way an animal helps a seed and one way an animal helps a flower." (Carries a seed on its fur, or eats fruit, or hides a nut; carries pollen.)

Then begin the one-to-one checks (see Assessment in the unit overview).

Vocabulary

result, pale, upright, floppy, pollen, flower, bee, carry

Differentiation

- **More help:** compare only light and dark; an adult guides the bee's hand movement if needed.
- **More challenge:** add a third flower with a blue ink pad, and see which colours end up where after several bee visits.
- A child who cannot hold a lolly stick can use a cotton-wool mitten or point to where the bee should go while a partner moves it.

⚠ Safety

- Washable, non-toxic ink only; aprons on; wipe hands before touching the cress pots.
- Nobody eats the cress. Afterwards the adult disposes of it, or lets it grow on as a class plant.
- Check for pollen allergies if you bring in real flowers; this lesson uses paper flowers only.

Teacher notes and misconceptions

- Children may say plants "eat soil". Our cress grew on cotton wool with only water and light, which is a good talking point (they still use stored food from the seed at first).
- Some children think bees visit flowers to help them. Bees visit for food; the pollen moving is a side effect that helps the plant.
- Pollen must reach the right part of the right kind of flower to make seeds. That detail is left for later grades.
- If the results do not match (for example a dark pot stayed short), talk about it honestly: "One pot was different. That is why we used three."

Grade 3 Science: Magnets - What Sticks, What Pushes and What Gets Through (5 lessons, about 2-3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 4 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules.

Back to the science progression

Big idea

A magnet can push or pull some things without touching them. It only pulls things made of a few metals (in a classroom, almost always iron or steel), so "metal" and "magnetic" are not the same word. Every magnet has two ends (poles): two different poles pull together and two matching poles push apart. Magnets can pull through some materials, and we can test which magnet is strongest with a fair test.

Outcomes

By the end of the unit a student can:

1. Predict, then test, whether twelve everyday objects are attracted to a magnet, and sort the results in a table.
2. Explain, with an example from their own results, why "all metals stick to magnets" is not true.
3. Show attraction and repulsion with two magnets and use the words "north pole", "south pole", "attract" and "repel" correctly.
4. Test whether a magnet still pulls a paper clip through paper, card, plastic, water and aluminium foil.
5. Carry out a fair test of magnet strength, naming the one thing they changed, two things they kept the same, and why they repeated it.
6. Describe how a compass uses a magnet to find north.

Prior knowledge

- Pushes and pulls make things start, stop and turn (kindergarten unit).
- Sorting objects into two groups and recording them in a table.
- No prior knowledge of magnets is assumed. This is the first unit in the science progression with a written fair test that has a measurement.

Lessons

Lesson	Title	Main activity
1	What sticks?	Predict, then test, twelve objects; sort magnetic vs not magnetic
2	Poles: pull together, push apart	Two bar magnets; ring magnets on a pencil; a hanging magnet turns to point north-south

Lesson	Title	Main activity
3	Does it work through things?	Paper clip through paper, card, plastic, water and foil; count sheets of paper
4	A fair test: which magnet is strongest?	Ruler test: how close must a paper clip be before it jumps? Three tries each
5	Using magnets	Floating compass; sorting challenge; end-of-unit check

Materials (per group of 3-4)

- 2 bar magnets with the poles marked (N/S or red/blue), plus one unmarked bar magnet for lesson 2.
- 2-3 different magnets for lesson 4 (for example a horseshoe magnet, a fridge magnet and a small bar magnet). **No small neodymium ("super") magnets or magnetic balls** - see Safety.
- 3 ring (doughnut) magnets and a pencil or wooden dowel that fits through them (lesson 2).
- 20 steel paper clips (check with a magnet first: plastic-coated steel clips are fine).
- A 30 cm ruler, masking tape, string or cotton thread, a sticky-tack blob.
- Lesson 1 objects: steel paper clip, aluminium foil ball, coins (see teacher note), plastic spoon, steel spoon, wooden lolly stick, rubber eraser, iron nail (blunt), drinks can (empty, rinsed), key, glass marble, piece of fabric.
- Lesson 3: paper sheets, a piece of card, a plastic cup, a clear plastic tub with water, aluminium foil.
- Lesson 5: a shallow bowl of water, a slice of cork or a plastic bottle lid, a steel paper clip straightened by the teacher, one shop-bought compass per group if available.

Assessment

- Lesson 1 prediction/result table (look for: predictions made before testing; a result column that is actually filled from the test, even where it disagrees with the prediction).
- Lesson 4 fair-test write-up (look for: one changed thing, two kept the same, three tries, a conclusion that matches the numbers).
- Lesson 5 end-of-unit check: 8 questions, 16 marks, with an answer guide. There is no pass mark; use it to see who needs more time with which idea.

⚠ Safety (read before lesson 1)

- **No small strong magnets.** Small neodymium magnets and magnetic balls are dangerous if swallowed: two or more can pull together through the gut wall and cause serious injury (see the Neodymium magnet source). Use only large classroom magnets too big to swallow, count them out and back in.
- Keep magnets away from phones, bank cards, computers and other electronic devices, and away from anyone with a pacemaker or other implanted medical device.
- Do not let students drop or bang magnets together hard: ceramic magnets chip and the chips are sharp.
- Use blunt nails. In lesson 5 the teacher straightens the paper clip; students do not use sewing needles.
- Wipe up spilled water from lesson 3 and lesson 5 straight away.

Sources

- Magnet: https://en.wikipedia.org/wiki/Magnet
- Magnetism: https://en.wikipedia.org/wiki/Magnetism
- Ferromagnetism (which materials are attracted): https://en.wikipedia.org/wiki/Ferromagnetism
- Iron: https://en.wikipedia.org/wiki/Iron
- Steel: https://en.wikipedia.org/wiki/Steel
- Stainless steel (some types are not magnetic): https://en.wikipedia.org/wiki/Stainless_steel
- Nickel: https://en.wikipedia.org/wiki/Nickel
- Aluminium: https://en.wikipedia.org/wiki/Aluminium
- Copper: https://en.wikipedia.org/wiki/Copper
- Coin (composition varies by country): https://en.wikipedia.org/wiki/Coin
- Magnetic field: https://en.wikipedia.org/wiki/Magnetic_field
- Iron filings: https://en.wikipedia.org/wiki/Iron_filings
- Compass: https://en.wikipedia.org/wiki/Compass
- Earth's magnetic field: https://en.wikipedia.org/wiki/Earth%27s_magnetic_field
- Lodestone: https://en.wikipedia.org/wiki/Lodestone
- Magnetic levitation: https://en.wikipedia.org/wiki/Magnetic_levitation
- Refrigerator magnet: https://en.wikipedia.org/wiki/Refrigerator_magnet
- Neodymium magnet (swallowing hazard): https://en.wikipedia.org/wiki/Neodymium_magnet
- Paper clip: https://en.wikipedia.org/wiki/Paper_clip
- Scientific control (keeping other things the same): https://en.wikipedia.org/wiki/Scientific_control

Known gaps and cautions

- "Magnetic materials" is simplified to iron and steel, with nickel and cobalt mentioned. Why only some metals are magnetic (ferromagnetism) is left for later grades.
- Coins, cans and "stainless" steel give different results in different countries and batches. Test your own objects before lesson 1 and treat a surprising result as good science, not a mistake.
- The compass explanation ("the Earth acts a bit like a giant magnet") is a simplification. A compass needle's north-seeking end points towards the Earth's magnetic pole in the far north, which is not exactly the same place as the geographic North Pole. Grade 3 students only need "points roughly north".
- Magnetic fields are only shown, not explained (optional iron-filings demo in a sealed bag in lesson 2). Field lines come in grades 6-8.
- No educator review yet.

Lesson 1: What sticks?

Unit overview · Next: Lesson 2

Goal

Students predict, then test, whether twelve objects are attracted to a magnet, and find out that only some metals are magnetic.

Materials (per group)

- 1 bar magnet.
- The twelve lesson 1 objects (see the unit overview), in a tray.
- Recording sheet: a table with columns Object | What it is made of | Prediction (sticks / doesn't) | Result (sticks / doesn't).

Steps

✎ Opening (5 min)

Read the safety rules aloud: magnets stay away from phones, tablets and bank cards; no banging magnets together; count magnets out and back in. Hold up a fridge magnet and ask: "Where have you seen magnets at home or at school? What do they stick to?"

✎ Main activity (25 min)

1. Groups look at each object and fill in "What it is made of" and their **prediction** in pen before anyone touches the magnet. Explain: we don't rub out predictions, even wrong ones - that is how we see what we learned.
2. Test each object: bring the magnet close slowly, then touch. Record "sticks" or "doesn't" in the Result column.
3. Groups sort the objects into two hoops or piles: "attracted to the magnet" and "not attracted".
4. Ask each group to circle any object where the result surprised them.

✓ Discussion questions (with example answers)

- Are all the things that stuck made of metal? Yes - in this set, every object that stuck was metal (iron or steel).
- Did every metal object stick? No. Aluminium foil, (usually) the drinks can and many coins did not stick, even though they are metal.
- So is this sentence true: "all metals stick to magnets"? No. Only a few metals do. In the classroom it is nearly always iron or steel. (Nickel and cobalt also stick, but students are unlikely to meet them on their own.)

- Did anything stick that you predicted wouldn't? Answers vary; a common one is a coin or a "silver" can. Praise changing your mind because of evidence.

✓ Closing check (5 min, with answers)

Hold up three objects the class has not tested, for example a steel safety pin (closed), a copper-coloured wire, and a plastic ruler. Students show thumbs up (will stick) or down. Test them in front of the class. **Expected: safety pin sticks (steel); copper wire and ruler do not.** Ask one student to explain the copper wire using today's rule.

Vocabulary

magnet, attract, magnetic, not magnetic, metal, iron, steel, aluminium, prediction, result

Differentiation

- Support: use six objects instead of twelve, with picture labels.
- Stretch: find three objects in the classroom that you predict will stick and three metal objects you predict won't. Test them and record.

⚠ Safety

See the overview. No magnets near the class computer or anyone's phone.

Teacher notes and misconceptions

- **Test every object yourself first.** Coins vary a lot by country and year: some are steel plated with copper or nickel and stick, others are copper, brass or cupronickel alloys and don't. Drinks cans are usually aluminium (don't stick) but some food and drink cans are steel (do stick). "Stainless" spoons may or may not stick depending on the type of stainless steel. Choose objects so that at least two metal objects do **not** stick.
- Common idea: "magnets attract all metal" or "magnets attract anything shiny". The foil ball is there to challenge this.
- Some students think magnets stick to anything heavy or hard. The glass marble and the key are a useful pair.

Lesson 2: Poles: pull together, push apart

Unit overview · Previous: Lesson 1 · Next: Lesson 3

Goal

Students find that each magnet has two poles, that unlike poles attract and like poles repel, and that a freely hanging magnet turns to point roughly north-south.

Materials (per group)

- 2 bar magnets with poles marked (N/S or colours).
- 3 ring magnets and a pencil or dowel standing upright in a lump of sticky-tack or modelling clay.
- 1 unmarked bar magnet, cotton thread, masking tape.
- Teacher only (optional): iron filings sealed inside a clear zip bag that is taped shut, and a bar magnet.

Steps

✎ Opening (5 min)

Hold two bar magnets so that the two N ends face each other and slowly bring them together. Ask: "What do you feel? What do you think will happen if I turn one round?" Take predictions.

✎ Main activity (25 min)

1. **Push and pull.** Groups try all four ways of putting the ends together: N-N, N-S, S-N, S-S. Record each in a table as "pull together" or "push apart".
2. **Floating rings.** Slide ring magnets onto the upright pencil one at a time. If a ring snaps down onto the one below, take it off, turn it over and put it back. Challenge: make all three float. Ask: "What is holding them up?"
3. **Mystery magnet.** Groups use a marked magnet to work out which end of the unmarked magnet is N and which is S, then label it with tape. (The end that pushes away the N of the marked magnet is also N.)
4. **Hanging magnet.** Tie thread round the middle of the marked bar magnet so it hangs level, away from other magnets and metal furniture. Let it stop turning. Which way does the N end point? Compare with the other groups.
5. Optional teacher demo: lay the sealed bag of iron filings over a bar magnet. The filings gather most at the ends. Ask: "Where is the magnet strongest?"

✓ Discussion questions (with example answers)

- Which pairs pulled together and which pushed apart? N-S and S-N pulled together (attract). N-N and S-S pushed apart (repel).

- Can you write that as a rule? Different poles attract; the same poles repel.
- Why do the ring magnets float? Their matching poles face each other and push apart, and the push is strong enough to hold up the ring's weight.
- Which way did the hanging magnets point? All roughly the same way, with the N end towards the north side of the room. (Check this with a compass beforehand so you can say which wall is north.)
- Where is a bar magnet strongest? At its ends (poles), shown by where most filings or paper clips gather.

✓ Closing check (5 min, with answers)

Draw two bar magnets on the board in three arrangements: (a) N facing S, (b) S facing S, (c) N facing N. Students write "attract" or "repel" for each. **(a) attract, (b) repel, (c) repel.**

Vocabulary

pole, north pole, south pole, attract, repel, compass direction (north)

Differentiation

- Support: give a two-row picture rule card ("different - pull", "same - push") to use while testing.
- Stretch: with three ring magnets floating, predict what happens if you press the top ring down and let go, then try it. (It bounces back up.)

⚠ Safety

See the overview. Iron filings stay sealed in a bag that is taped shut; students never handle loose filings (they get into eyes and skin and are very hard to remove from magnets).

Teacher notes and misconceptions

- Common idea: "the bigger magnet always wins" or "N is the strong end". The poles of a magnet are equally strong; size and material change overall strength (lesson 4).
- A magnet's N pole is short for "north-seeking pole": the end that turns towards the north. Students don't need the explanation of why (the Earth's magnetic field) until lesson 5, and then only simply.
- Old magnets can lose strength or even have their poles mislabelled. Check your set with a compass first.
- Steel furniture, radiators and other magnets nearby can stop the hanging magnet pointing north. Hang it from a wooden or plastic support.

Lesson 3: Does it work through things?

Unit overview · Previous: Lesson 2 · Next: Lesson 4

Goal

Students test whether a magnet still pulls a paper clip through different materials, and count how many sheets of paper it can pull through.

Materials (per group)

- 1 bar magnet, 2 steel paper clips.
- A piece of card, a plastic cup, a clear plastic tub of water, a square of aluminium foil, 20 sheets of thin paper.
- Teacher only: a steel baking tray or steel tin lid (check with a magnet that it sticks).
- Recording sheet: Material | Prediction (pulls through / doesn't) | Result.

Steps

✎ Opening (5 min)

Put a paper clip on top of a book and move a magnet under the book's cover. Ask: "Did the magnet have to touch the clip? What is in between?" Take predictions about other materials before testing.

✎ Main activity (25 min)

1. **Through materials.** For each material, students predict, then test:
2. card: clip on top, magnet slid underneath;
3. plastic cup: clip inside, magnet outside, drag the clip up the side;
4. water: clip in the bottom of the tub of water, magnet against the outside of the tub, drag the clip up the side;
5. aluminium foil: wrap the clip loosely in foil and try to pick it up.
6. **Counting sheets.** Put the magnet flat on the table. Lay sheets of paper on top of it one at a time and put a clip on top. After each sheet, slide the magnet slowly sideways. Does the clip follow? Record the largest number of sheets where the clip still follows.
7. Groups write their sheet count on the board.
8. **Teacher demo.** Put the steel tray between the magnet and a clip. Ask the class to predict, then show: the magnet sticks to the tray and barely pulls the clip at all.

✓ Discussion questions (with example answers)

- Which materials did the magnet pull through? Card, plastic, water and aluminium foil (and paper, up to a point).
- Why didn't the foil stop it? Foil is metal. Aluminium isn't magnetic, so the pull goes through it, like through paper (link to lesson 1).

- Why did the steel tray stop it? Steel is magnetic, so the magnet pulled on the tray instead of the clip.
- Did every group get the same sheet count? Why not? No. Different magnets, different paper thickness, sliding faster or slower. That is a hint for tomorrow: to compare magnets fairly we must keep those things the same.

✓ Closing check (5 min, with answers)

A student says: "A magnet can't pull through water because water stops things." Who agrees? Ask someone to describe today's test that shows this is wrong. **The clip moved up the side of the tub through the water.**

Vocabulary

through, material, magnetic, not magnetic, distance, gap

Differentiation

- Support: test only card, water and foil.
- Stretch: does it work through your hand? (Yes - try it with one clip on the back of a flat hand and the magnet underneath. Hands are not magnetic.)

⚠ Safety

See the overview. Wipe up water straight away. Keep the water tub away from any electrical sockets and devices.

Teacher notes and misconceptions

- Common idea: "magnets only work if they touch" - the opening book demo challenges this. Another is "metal blocks magnets" - the foil test shows only magnetic metals do.
- Results for the sheet count vary widely; that is useful. Don't present any number as "right".
- Some flexible fridge magnets only pull on one face and are very weak at a distance. If a group uses one, expect a small sheet count.

Lesson 4: A fair test: which magnet is strongest?

Unit overview · Previous: Lesson 3 · Next: Lesson 5

Goal

Students carry out a fair test to compare the strength of different magnets, measuring the distance at which a paper clip jumps to each magnet, and repeat each test three times.

Materials (per group)

- 2-3 different magnets (for example horseshoe, bar, fridge magnet).
- 1 steel paper clip, a 30 cm ruler, masking tape.
- Recording sheet: a table with one row per magnet and columns Try 1 | Try 2 | Try 3 | Middle number (cm).

Steps

✎ Opening (5 min)

Hold up two magnets. "Which one is stronger? How could we find out in a way that is fair?" Collect ideas. Remind the class of yesterday: groups got different sheet counts partly because they did things differently.

✎ Main activity (25 min)

1. **Set up.** Tape the ruler flat to the table. Put the first magnet at the 0 cm end, with one pole touching the 0 mark. Put the paper clip at the 15 cm mark.
2. **Test.** Slowly push the clip towards the magnet with a pencil tip, a little at a time. As soon as the clip jumps to the magnet, stop. Read the ruler where the clip was just before it jumped (to the nearest half centimetre). Record it as Try 1.
3. **Repeat.** Do it two more times with the same magnet. Then do three tries with each other magnet.
4. **Middle number.** For each magnet, put the three tries in order and circle the middle one. Write it in the last column.
5. **Fair test talk.** As a group, fill in: "We changed ____. We kept ____ and ____ the same. We did it three times because ____."

Example results (for teacher reference; yours will differ)

Magnet	Try 1	Try 2	Try 3	Middle number
Horseshoe	4 cm	5 cm	4 cm	4 cm
Bar	3 cm	3.5 cm	2.5 cm	3 cm

Magnet	Try 1	Try 2	Try 3	Middle number
Fridge magnet	0.5 cm	0.5 cm	0.5 cm	0.5 cm

Here the horseshoe magnet is strongest because the clip jumped from furthest away.

✓ Discussion questions (with example answers)

- What did you change? The magnet.
- What did you keep the same? The same paper clip, the same ruler, the same table, starting at 15 cm, pushing slowly, using the same kind of end (a pole) facing the clip.
- Why did we do three tries? The numbers wobble a little each time (pushing speed, reading the ruler). Three tries and the middle number make the result more trustworthy than one try.
- Is the biggest magnet always the strongest? Not necessarily. A small magnet made of a stronger material can beat a bigger one. Use your data.
- What would be unfair? For example, using a heavier clip for one magnet, or pushing the clip fast for one and slowly for another.

✓ Closing check (5 min, with answers)

Show this table: Magnet A tries 6, 5, 6 cm; Magnet B tries 2, 9, 3 cm. "Which magnet is stronger, and is anything strange?" **A is stronger (middle 6 cm vs B's middle 3 cm). B's 9 cm try is very different from the others, so it was probably a mistake (for example, the clip was bumped). It is a reason to repeat, not to pick the biggest number.**

Vocabulary

fair test, change, keep the same, measure, centimetre, repeat, result, middle number, strongest

Differentiation

- Support: test two magnets only; pre-printed sentence frames for the fair test talk.
- Stretch: plan a second fair test of a different question, for example "Does a thicker paper clip jump from further away?", naming what to change and what to keep the same.

⚠ Safety

See the overview. Push the clip with a pencil, not fingers, so fingers do not get pinched between clip and magnet.

Teacher notes and misconceptions

- This is the first fair test with a measurement in the science progression. Spend time on "what we kept the same"; it matters more than the answer.
- "Middle number" is the median of three. You don't need the word at this age; it avoids the arithmetic of an average.

- A horseshoe magnet has both poles side by side; place it so both poles face the clip, and write that down as one of the things kept the same for that magnet.
- Magnets pick up strength differences very sensitively near the poles; half-centimetre reading is enough for this age.

Lesson 5: Using magnets

Unit overview · Previous: Lesson 4

Goal

Students make a simple floating compass, use magnets to solve a sorting problem, and complete the end-of-unit check.

Materials (per group)

- 1 bar magnet, a shallow plastic bowl of water, a slice of cork or a plastic bottle lid.
- 1 steel paper clip, straightened by the teacher before the lesson, with any sharp ends taped.
- A shop-bought compass (one per group, or one for the class).
- Sorting tray: a mixture of about 10 steel paper clips, 10 aluminium foil balls, 10 plastic buttons and 10 dried beans or pasta shapes, mixed in one tub. A plastic sandwich bag.
- End-of-unit check sheets.

Steps

✎ Opening (5 min)

Show a shop-bought compass. Turn it slowly; the needle keeps pointing the same way. Ask: "What do you think is inside it? Which lesson does this remind you of?" (The hanging magnet in lesson 2.)

✎ Main activity (25 min)

1. **Magnetise the clip.** Stroke the straightened clip with one end (pole) of the bar magnet about 30 times, always in the same direction, lifting the magnet away at the end of each stroke. Test: will it now pick up another paper clip? (A weak pick-up is enough.)
2. **Float it.** Lay the clip on the cork or bottle lid, floating in the middle of the bowl, away from other magnets and steel. Wait until it stops turning. Compare its direction with the shop-bought compass. Mark the north-pointing end with a dot of marker.
3. **Sorting challenge.** "A recycling centre has mixed up steel, aluminium, plastic and food scraps. Use only the magnet to get the steel out without the magnet touching the clips." Hint if needed: put the magnet inside a plastic bag, pull out the clips, then hold the bag over a tray and pull the magnet out of the bag so the clips drop off.
4. **End-of-unit check** (15 min, individually; below).

✓ Discussion questions (with example answers)

- Why does the floating clip turn? Stroking made it into a weak magnet. The Earth acts a bit like a giant magnet, so a free magnet turns to point roughly north-south.

- Why must the compass be away from other magnets and steel? They pull on the needle more strongly than the Earth does, so it points the wrong way.
- Why use a bag in the sorting challenge? So the clips can be dropped off easily; magnets hold steel clips tightly.
- What was left in the tub after the magnet? Aluminium, plastic and beans/pasta. A magnet can't sort those, because none of them are magnetic.

✓ End-of-unit check (8 questions, 16 marks)

1. Circle the objects a magnet will attract: steel paper clip, plastic ruler, iron nail, aluminium foil, wooden spoon. (2 marks)
2. Mia says, "All metal objects stick to magnets." Is she right? Explain using an example. (2 marks)
3. Two bar magnets are placed with N facing S. Do they attract or repel? What if they are placed with S facing S? (2 marks)
4. Name one material a magnet can pull a paper clip through, and one that would stop it. (2 marks)
5. Sam tests three magnets with the ruler test. Magnet X: 2, 2, 3 cm. Magnet Y: 5, 6, 5 cm. Magnet Z: 1, 1, 1 cm. Which magnet is strongest? How do you know? (2 marks)
6. In the ruler test, name the one thing that was changed and two things that were kept the same. (2 marks)
7. Why did we do each ruler test three times? (2 marks)
8. A hiker's compass is pointing the wrong way. She notices her phone and a magnet-clasp bag are right next to it. What should she do, and why? (2 marks)

Answer guide

1. Steel paper clip and iron nail (1 mark each, 2 marks in total; take 1 mark off, to a minimum of 0, for each wrong object circled).
2. No (1). Any correct example of a non-magnetic metal, for example aluminium foil, an aluminium can, a copper or brass coin from their own test (1).
3. N-S attract (1); S-S repel (1).
4. Through: any of paper, card, plastic, water, aluminium foil, a hand (1). Stop: a sheet of steel or iron, such as a steel tray or tin lid (1). Accept "lots of thick paper" for the stop answer only if they explain the gap became too big.
5. Magnet Y (1), because the clip jumped from furthest away / its middle number (5 cm) is the biggest (1).
6. Changed: the magnet (1). Kept the same: any two of the same clip, same ruler, same starting point, same slow pushing, same end/pole facing the clip, same table (1 for both).
7. The results change a little each time (1), so repeating makes the result more trustworthy / lets us spot a mistake (1).
8. Move the phone and bag away from the compass (1), because magnets (and magnetic things nearby) pull on the compass needle more strongly than the Earth does (1).

There is no pass mark. Note which questions each student missed: Q1-2 point back to lesson 1, Q3 to lesson 2, Q4 to lesson 3, Q5-7 to lesson 4, Q8 to lesson 5.

Vocabulary

compass, magnetise, north, Earth's magnetism, sort, separate, recycle

Differentiation

- Support: read the check questions aloud; accept spoken or drawn answers.
- Stretch: explain why scrapyards and recycling centres use large magnets, and what they still need another method for (aluminium cans; the grade 5 dissolving unit returns to separating mixtures).

⚠ Safety

See the overview. The teacher straightens and tapes the paper clips; no sewing needles. Wipe up water straight away. Count magnets back in.

Teacher notes and misconceptions

- Magnetising by stroking gives only a weak magnet, and some clips work better than others. Test the method the day before. If a clip won't float steadily, the bottle lid usually works better than cork.
- Common idea: "the compass points to the North Pole because there's a big magnet there". The simple version ("the Earth acts a bit like a giant magnet") is enough at grade 3; the Earth's magnetic north pole is not exactly the geographic North Pole and it moves slowly.
- The sorting challenge previews separating mixtures in grade 5.

Grade 3 Science: Weather Over a Season (5 lessons, about 2-3 weeks, plus a short daily record)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 12 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules.
>
> Text-checked by two other agents (Gemini 3.8 Flash and Gemini 4 Argon); see Known gaps.

Back to the grade 3 year plan - Term 2. Builds on kindergarten science: Using our senses and watching the weather, grade 2 science: Land and water, fast and slow, grade 3 science term 1: Magnets, grade 3 mathematics term 1: Equal groups and arrays and the science progression

Big idea

Weather is what the air outside is like at one place and one time: how warm it is, whether rain or snow is falling, where the wind is coming from and what the sky looks like. Scientists measure the weather every day and write it in tables, so that they can see patterns. The patterns let us say what the weather is **usually** like in each season, and make a careful guess about what might come next. The usual weather of a place over many years is its **climate**, and different places in the world have very different climates. People cannot stop storms or floods, but they can design things that make the harm smaller, and we can test which design works better.

This is the second science unit of grade 3 (term 2). In kindergarten the class kept a picture weather chart. Now the class measures the weather with simple instruments, writes numbers in a table and draws bar graphs and pictographs. The daily record started in lesson 1 keeps going for the rest of the term (and can go on all year), so that by the end of the season the class has its own data.

Outcomes

By the end of the unit most children can:

1. Read a thermometer in degrees Celsius, a rain gauge in millimetres and a wind streamer with a compass, and write the readings in the class weather table.
2. Read a weather table for one week and answer questions such as "Which day was warmest?" and "How much rain fell in all?"
3. Make a pictograph or a bar graph from a weather table, and answer "how many more" questions from it.
4. Use a table of usual weather in each season to say what the weather is usually like in summer and winter, and explain why "usually" is not the same as "always".
5. Combine a picture card and a fact card to describe the climate of a place, and say the difference between weather and climate.
6. Test two designs that keep flood water away from a model house, and make a claim about which works better, giving evidence from the test.

Prior knowledge

- Kindergarten science: a daily weather chart with picture cards; counting sunny, cloudy and rainy days.
- Grade 1 science: the Sun's daily pattern; long and short days in different seasons. Grade 1 society: maps and globes.
- Grade 2 science term 2: comparing ways of protecting a sand hill from poured water, keeping the water the same each time.
- Grade 3 science term 1: a compass needle points north.
- Mathematics: reading scales in ones and twos; tally marks; simple bar graphs and pictographs (grade 2); counting in twos and fives (grade 3 term 1).
- Children read short labels and numbers in tables. Fact cards are read aloud by an adult.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week. From lesson 1 on, two weather helpers (a new pair each week) take the readings every school day at the same time, with an adult, and write them in the class weather table (about 3 minutes).

1. Measuring the weather: weather words; reading a thermometer, a rain gauge and a wind streamer with a compass; setting up the weather station; the first row of the class weather table.
2. Tables and graphs: reading a made-up week of weather in Little Hill; a pictograph of twenty days' weather; a bar graph of rain.
3. What is each season usually like?: a made-up table of usual weather in each season in Little Hill; a bar graph of temperatures; comparing three summers to see that "usually" is not "always"; making careful predictions.
4. Climates around the world: weather and climate; three climate picture cards and fact cards (a tropical rainforest climate, a desert climate and a tundra climate); finding them on a globe; combining the clues to describe each one.
5. Keeping flood water out: weather hazards (gently); testing two model flood barriers around a model house; a claim with evidence; looking at other designs (lightning rods and strong roofs); the end-of-unit check.

At the end of the term (or of the season), use 20 minutes to make a class bar graph of the class's own records (for example, the number of rainy days each week) and compare it with the Little Hill table from lesson 3.

Materials (whole class unless noted)

- **Lesson 1:** an outdoor thermometer with a plastic case and a large Celsius scale (spirit-filled, not mercury); a rain gauge (a straight-sided clear plastic bottle, cut by an adult, with the cut edge covered in tape, the top turned upside down as a funnel, and a ruler taped on the outside with 0 at the bottom of the water space; or a bought plastic rain gauge); a cup of water for the demonstration; a wind streamer (a ribbon about 50 cm long tied to a stick or a fence); a compass (one from the magnets unit); four direction cards (N, E, S, W); a large class weather table (columns: date, temperature in °C, rain in mm, wind from, sky); sky picture cards (sunny, cloudy, rain, snow, fog); a large teaching thermometer picture with a moving strip; for each pair, a thermometer practice sheet (six thermometer pictures to read).

- **Lesson 2:** the Little Hill week table (in Lesson 2) on the board and one copy for each pair; the twenty-day weather list and a blank pictograph sheet for each pair; for each pair, a blank bar graph sheet (five days along the bottom, rain in mm up the side in twos from 0 to 14); pencils and coloured pencils; squared paper for stretch; the class weather table.
- **Lesson 3:** the Little Hill season table and the "three summers" table (in Lesson 3) on the board and one copy for each pair; for each pair, a blank bar graph sheet (four seasons along the bottom, temperature in °C up the side in twos from 0 to 24); six prediction cards; pencils; the class weather table.
- **Lesson 4:** a globe; a world map; three A4 climate picture cards and three climate fact cards (in Lesson 4); the Little Hill season table from lesson 3; for each group of 4-5, a "climate clues" sheet; pencils; the class weather table.
- **Lesson 5:** for each group of 4-5, a shallow plastic tray or box about 30 cm long with a rim at least 5 cm high, damp washed play sand, a small wooden block or a plastic brick (the "house"), a square of paper towel about 5 cm across under the house (at least three per group, one for each pour), a plastic jug with 200 ml of water marked on it, a pouring cup, a lump of modelling clay (latex-free, about the size of a tennis ball), eight lolly sticks, a book or block about 3 cm thick to tilt the tray; a few spare paper towel squares; a results chart; three design picture cards (a flood barrier, a lightning rod on a roof, a roof tied down with strong straps); aprons, cloths and a bucket for wet sand.
- For blind or low-vision children: a talking thermometer or a large tactile thermometer model with a sliding strip and raised marks every 2 °C; a rain gauge ruler with raised marks every 10 mm; a ribbon streamer they can hold to feel which way it is blown; tactile bar graphs (stuck-on card squares); tactile climate cards (for example warm damp leaves texture, dry sand, cold smooth plastic); the tray test can be checked by feeling whether the paper towel is wet.
- Hand-washing sinks, paper towels.

⚠ Safety and access

- **Outside (lesson 1 and the daily record).** The weather station is in a place the teacher has checked, inside the school grounds, where children can stand safely. Readings are taken with an adult. Nobody climbs to reach the instruments; the thermometer and gauge are fixed at a height children can reach from the ground.
- **The rain gauge.** An adult cuts the bottle and covers the cut edge with tape. Children never cut it. Empty it after each reading.
- **Thermometer.** Use a plastic-cased spirit thermometer, never a mercury or a glass one. Never look at the Sun; the thermometer goes in the shade.
- **Bad weather.** In storms, lightning or ice, nobody goes out: the adult takes the reading later, or the table says "not read today". That is honest data too.
- **Feelings (lessons 4 and 5).** Some children may have lived through a flood, a storm, a fire or other hard weather. Tell families before lesson 5 what it is about. Talk about hazards calmly, with no frightening pictures or stories. Any child may sit out the talk and do the tray test only, or be a helper. Never ask children about their own homes or experiences.
- **Water and sand (lesson 5).** Aprons on; wipe spills at once so the floor is not slippery; sand stays in the trays and away from faces. Wash hands.
- **Modelling clay.** Check for latex and wheat allergies (some home-made dough contains wheat).
- Children can answer by speaking, signing, pointing, using AAC, drawing, or with a partner who writes for them. Their own way counts.

- Deaf children: show every picture and table while it is described; face the class when reading fact cards aloud. Blind and low-vision children: use the tactile materials above; a partner reads the numbers aloud.
- Colour is never the only clue: bar graphs use a label on each bar, and sky cards have a picture and a word.
- Wheelchair users: put the weather station on a firm, level path at a height they can reach; trays go on a table they can reach.

Assessment

Watch and listen during lessons, and use the closing checks. During lesson 5 or the following week, see each child for about 3 minutes with the materials listed (answers in brackets):

1. Show the teaching thermometer picture set to 14 °C and the rain gauge with water at 6 mm. "What is the temperature? How much rain fell?" (14 °C; 6 mm.) Hold the streamer so it blows towards the south (or show a picture of this). "Where is the wind coming from?" (From the north.) (Outcome 1.)
2. Show the Little Hill week table from lesson 2. "Which day was coldest? How much rain fell in all?" (Wednesday, 8 °C; 18 mm.) (Outcome 2.)
3. Show the child's own pictograph from lesson 2. "How many more cloudy days than sunny days?" (3.) (Outcome 3.)
4. Show the Little Hill season table from lesson 3. "What is summer usually like in Little Hill?" (Warm, about 22 °C, with few rainy days, about 5.) "Will every summer day be 22 °C?" (No; that is what is usual, and some days and some summers are warmer or cooler.) (Outcome 4.)
5. Show the desert picture card and fact card from lesson 4. "Tell me about the climate there." (Very dry, little rain; any detail from the cards.) "What is the difference between weather and climate?" (Weather is what it is like today; climate is what it is usually like over many years.) (Outcome 5.)
6. Show the class results chart from lesson 5. "Which barrier worked better? How do you know?" (The one where the paper towel under the house stayed driest; any answer that matches the class's results and gives that evidence.) (Outcome 6.)

Sources

Quoted exactly; the unit is not a full alignment to these standards.

- Next Generation Science Standards, grade 3, Weather and Climate: https://www.nextgenscience.org/topic-arrangement/3weather-and-climate
  - 3-ESS2-1: "Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season." Clarification statement: "Examples of data could include average temperature, precipitation, and wind direction." Assessment boundary: "Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change."
  - 3-ESS2-2: "Obtain and combine information to describe climates in different regions of the world."
  - 3-ESS3-1: "Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard." Clarification statement: "Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods."

    - ESS2.D: "Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next." "Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years."
    - ESS3.B: "Humans cannot eliminate natural hazards but can take steps to reduce their impacts."
- Wikipedia (lead paragraphs, read 2026-11-12):
    - Weather: "Weather refers to day-to-day temperature, precipitation, and other atmospheric conditions, whereas climate is the term for the averaging of atmospheric conditions over longer periods of time."
    - Climate: "Climate is the long-term weather pattern in a region, typically averaged over 30 years."
    - Wind direction: "Wind direction is generally reported by the direction from which the wind originates. For example, a north or northerly wind blows from the north to the south".
    - Rain gauge: it is used "to determine the depth of precipitation (usually in mm)".
    - Tropical rainforest climate: "high mean annual temperatures, small temperature ranges, high humidity, and rain that falls throughout the year with no dry season"; "usually found within 10 to 15 degrees latitude of the equator".
    - Desert climate: "The typically bald, rocky, or sandy surfaces in desert climates are dry and hold little moisture, quickly evaporating the already little rainfall they receive."; "There are two variations of a desert climate according to the Köppen climate classification: a hot desert climate (BWh), and a cold desert climate (BWk)."
    - Tundra climate: "located in high latitudes and high mountains"; "at least one month has an average temperature high enough to melt snow 0 °C (32 °F), but no month with an average temperature in excess of 10 °C (50 °F)"; "Rainfall and snowfall are generally slight".
    - Lightning rod: "If lightning hits the structure, it is most likely to strike the rod and be conducted to ground through a wire, rather than passing through the structure, where it could start a fire or cause electrocution."
    - Flood barrier: "Flood barrier may also refer to barriers placed around or at individual buildings to keep floodwaters from entering the buildings."

Known gaps and cautions

- Two other agents text-checked this unit on 2026-11-12 and reported no errors: Gemini 3.8 Flash (at 903d528) and Gemini 4 Argon (at 823de91). Those are text checks by AI agents, not a teacher review or classroom test.
- Little Hill is a made-up place, and all its weather numbers (the week table, the twenty days, the season table and the three summers) are made up by the author to be easy to graph. They are examples, not real data.
- The climate cards describe climate types from Wikipedia, not named countries or peoples. The fact cards say nothing about how people live there, to avoid passing on stereotypes. A teacher may add real places from a good atlas.
- The season table fits a place with four clear seasons, like many places in North America and Europe. In the southern half of the world the seasons fall in different months, and many places near the equator have wet and dry seasons instead. Teachers there should use their own seasons.
- The unit does not explain **why** seasons happen (the tilt of the Earth); that is left for grade 5 in the science progression.

- Following the 3-ESS2-1 assessment boundary, the unit does not teach or assess climate change.
- Averages are not taught: "usual" temperatures are given in the table, and children compare them, but they do not calculate a mean. Wind speed and humidity are not measured.
- The tray test is a model: real flood barriers are much bigger and water pushes harder on them. Two designs and one pour each is a small test, not proof. The lesson builds on grade 2's sand-hill test, so some children may remember the idea; the new part is a claim about merit with evidence.
- Lightning rods and strong roofs are discussed from picture cards only; nothing electrical is tested.
- The lesson order, the instruments, the made-up data, the card wording and the assessment items are the author's own choices, not taken from a source.
- Timings are untested guesses. Going outside to the weather station with a full class takes time.
- No images yet.

Lesson 1: Measuring the weather

Unit overview - Next: Tables and graphs

Back to the grade 3 year plan

Goal

Children learn to read a thermometer, a rain gauge and a wind streamer with a compass, set up the class weather station, and write the first row of the class weather table.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5.

Materials

- An outdoor thermometer with a plastic case and a large Celsius scale (spirit-filled, not mercury), fixed in the shade at a height children can read from the ground.
- A rain gauge: a straight-sided clear plastic bottle cut by an adult, with the cut edge covered in tape, the top turned upside down as a funnel, and a ruler taped on the outside with 0 at the bottom of the water space. A bought plastic rain gauge also works. Put it in an open place away from walls and trees, standing firmly (for example in a pot of sand).
- A cup of water, to show how the rain gauge works.
- A wind streamer: a ribbon about 50 cm long tied to a stick or a fence.
- A compass (one from the magnets unit) and four direction cards (N, E, S, W).
- The class weather table on a large sheet, with five columns: date, temperature in °C, rain in mm, wind from, sky.
- Sky picture cards, each with a picture and a word: sunny, cloudy, rain, snow, fog.
- A large teaching thermometer picture with a moving strip (a red paper strip that slides up and down a card thermometer marked every 2 °C from -10 to 40).
- For each pair: a thermometer practice sheet with six thermometer pictures to read (answers in Closing check), and a pencil.
- For blind or low-vision children: a talking thermometer, or the tactile thermometer model with raised marks every 2 °C; a rain gauge ruler with raised marks every 10 mm; the streamer to hold.

Steps

✎ Opening (5 min)

Ask: "What was the weather like on the way to school today?" Collect words: sunny, cloudy, windy, wet, cold, warm. Say: "In kindergarten we used pictures for the weather. Scientists use **instruments** to measure the weather with numbers. Numbers let us compare one day with another. Today we start our own **weather station**."

Show the three instruments and name them: **thermometer** (how warm or cold), **rain gauge** (how much rain), **wind streamer** and compass (where the wind comes from).

✎ Main activity (25 min)

- **Reading a thermometer (8 min).** Use the teaching thermometer picture. Point out that the numbers go up in twos, and that the marks between the numbers are the odd numbers. Slide the strip to 10, 14, 21 (between 20 and 22) and 0, and read each together: "The top of the red strip is level with... 14 degrees Celsius." Write **°C** and say it. Pairs read the first three pictures on the practice sheet.
- **Reading a rain gauge (5 min).** Show the gauge. Pour in a little water from a cup to show how it works. "The rain falls into the funnel. We read where the top of the water is on the ruler, in **millimetres** (mm). Then we empty it, ready for tomorrow." Read the level together.
- **Wind from... (5 min).** Go outside to the weather station (or look from the window if it is not safe to go out). One child holds the compass flat and the class finds north. Put the four direction cards on the ground around the streamer. "Look which way the ribbon is blown. Weather scientists say where the wind **comes from**, not where it is going. If the ribbon is blown towards the south, the wind is coming from the north: a north wind."
- **First readings (7 min).** With the class watching, two helpers read the thermometer and the rain gauge (if it has had no time to catch rain, write 0), look at the streamer and the sky, and the teacher writes the first row of the class weather table. If there is no wind, write "calm". Agree the daily time for readings, and the first pair of weather helpers.

✓ Discussion questions (5 min, with answers)

- "Why do we read the weather at the same time every day?" (So that days are fair to compare; the afternoon is usually warmer than the early morning.)
- "Why is the thermometer in the shade?" (In the sun it gets warm itself and reads higher than the air; we want the air's temperature.)
- "The ribbon is blowing towards the east. Where is the wind coming from?" (From the west.)
- "Why do we empty the rain gauge after reading it?" (So that tomorrow's number shows only the new rain.)

✓ Closing check (5 min, with answers)

Pairs finish the practice sheet, then check together. The six pictures show:

1. 12 °C (answer: 12)
2. 6 °C (answer: 6)
3. 17 °C, one mark above 16 (answer: 17)
4. 25 °C, one mark above 24 (answer: 25)
5. 0 °C (answer: 0)
6. 30 °C (answer: 30)

Then show with a thumb up or down: "Is a 6 °C day warmer than a 12 °C day?" (Down: no, colder.)

Vocabulary

weather, instrument, thermometer, degrees Celsius (°C), rain gauge, millimetre (mm), wind direction, compass, north, east, south, west

Differentiation

- **More help:** read only the numbered marks (10, 20, 30) first; an adult slides the strip while the child says "higher" or "lower".
- **More challenge:** read a thermometer picture below zero (for example -4 °C) and say what might happen to a puddle on that day (it may freeze).
- Children who use a talking thermometer or the tactile model take a full turn as a weather helper.

⚠ Safety

- Readings outside are taken with an adult. Nobody climbs to reach an instrument.
- Plastic-cased spirit thermometer only; never mercury or glass.
- An adult cuts the rain gauge bottle and tapes the edge.
- Never look at the Sun. In storms, lightning or ice, nobody goes out: write "not read today".

Teacher notes and misconceptions

- Children often read the bottom of the bulb, or the number nearest the top instead of the level of the top. Model "level with the top of the strip".
- The odd numbers are not written on many thermometers. Counting in twos from the last number helps.
- "A north wind blows to the north" is a common mix-up. Keep saying "comes from".
- A compass can be pulled off north by steel nearby (a fence, a car, a radiator); stand a few steps away, as in the magnets unit.
- The table is real data. If a reading is missed, leave the box empty or write "not read"; never make up a number to fill it.

Lesson 2: Tables and graphs

Unit overview - Previous: Measuring the weather - Next: What is each season usually like?

Back to the grade 3 year plan

Goal

Children read a weather table for one week, make a pictograph of twenty days' weather and a bar graph of rain, and answer "how many more" questions from their graphs.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. The weather helpers take today's reading before or after the lesson.

Materials

- The class weather table from lesson 1.
- The Little Hill week table (below) on the board, and one copy for each pair.
- For each pair: the twenty-day weather list (below) and a blank pictograph sheet (four rows: sunny, cloudy, rain, fog; key "one sun, cloud, raindrop or fog picture = 1 day").
- For each pair: a blank bar graph sheet, with the five days (Monday to Friday) along the bottom and "rain in mm" up the side in twos from 0 to 14.
- Pencils and coloured pencils; squared paper for stretch.
- For blind or low-vision children: a tactile copy of the week table (large print or braille), and card squares with sticky backs to build the bar graph by touch.

The Little Hill week table

This is made-up data for the made-up town of Little Hill, in autumn. It is an example, not from a source.

Day	Temperature (°C)	Rain (mm)	Wind from	Sky
Monday	11	0	west	sunny
Tuesday	9	4	west	rain
Wednesday	8	12	south-west	rain
Thursday	12	0	north	cloudy
Friday	10	2	west	rain

The twenty-day weather list

Twenty school days in Little Hill (made up): sunny 5 days, cloudy 8 days, rain 6 days, fog 1 day.

Steps

✎ Opening (5 min)

Look at the class weather table together: "How many days have we recorded so far? What was the warmest reading?" Say: "A **table** keeps numbers tidy in rows and columns. Today we read a whole week of weather from a place called Little Hill, and make **graphs** that show the pattern at a glance."

✎ Main activity (25 min)

- **Reading the week table (8 min).** Read the headings together. Point to a row: "Each row is one day." Point to a column: "Each column is one kind of measurement." Ask pairs, one at a time, and let them point to the answer:
  - "What was the temperature on Thursday?" (12 °C.)
  - "Which day was coldest?" (Wednesday, 8 °C.)
  - "Which day had the most rain?" (Wednesday, 12 mm.)
  - "On how many days did it rain?" (3: Tuesday, Wednesday, Friday.)
  - "Where did the wind usually come from this week?" (The west; on 3 of the 5 days.)
- **Pictograph (8 min).** Pairs draw one picture for each day in the twenty-day list: 5 suns, 8 clouds, 6 raindrops and 1 fog picture, in neat lines so the rows can be compared.
- **Bar graph of rain (9 min).** Model one bar on the board: Tuesday, 4 mm, "two squares up, because each line goes up in twos". Pairs draw the bars for all five days (Monday 0, Tuesday 4, Wednesday 12, Thursday 0, Friday 2) and label each bar with its number. A day with 0 mm has no bar; write 0 above it.

✓ Discussion questions (5 min, with answers)

- "Look at your pictograph. What kind of weather happened most often?" (Cloudy, 8 days.)
- "How many more cloudy days than sunny days?" (3; 8 - 5.)
- "On how many of the twenty days was there no rain?" (14; 5 + 8 + 1, or 20 - 6.)
- "How much rain fell in the whole week?" (18 mm; 0 + 4 + 12 + 0 + 2.)
- "Which is quicker for seeing the wettest day: the table or the bar graph?" (Usually the bar graph: the tallest bar shows it at once. Any reason is fine.)

✓ Closing check (5 min, with answers)

Each child answers on paper, aloud or by pointing at their graphs:

1. "How many more rain days than sunny days?" (1; 6 - 5.)
2. "How much more rain fell on Wednesday than on Tuesday?" (8 mm; 12 - 4.)
3. "What was the difference between the warmest and the coldest day?" (4 °C; 12 - 8.)

Vocabulary

table, row, column, pictograph, bar graph, key, scale, most, fewest, how many more, in all

Differentiation

- **More help:** use the pictograph only; count rows by touching each picture; an adult draws the bar graph scale lines in ones instead of twos.
- **More challenge:** make a pictograph where one picture means 2 days (a half picture for 1 day), or draw a bar graph of the temperatures on squared paper.
- Children who find drawing hard can stick on picture cards or card squares.

⚠ Safety

- No special hazards. Coloured pencils stay on the table.

Teacher notes and misconceptions

- Children may count the squares instead of reading the scale. Ask "What number is at the top of this bar?"
- A 0 mm day is often forgotten in a bar graph, or given a small bar. "No rain, no bar" helps.
- The week table has a "rain" day (Friday) with only 2 mm: a light shower still counts as rain.
- Little Hill data are made up to be easy to graph. Real weather is usually messier, which children will see in their own class table.

Lesson 3: What is each season usually like?

Unit overview - Previous: Tables and graphs - Next: Climates around the world

Back to the grade 3 year plan

Goal

Children use a table of usual weather in each season to make a bar graph, say what each season is usually like, compare three summers to see that "usually" does not mean "always", and make careful predictions.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5.

Materials

- The class weather table.
- The Little Hill season table and the three summers table (below) on the board, and one copy of each for each pair.
- For each pair: a blank bar graph sheet with the four seasons (winter, spring, summer, autumn) along the bottom and "usual afternoon temperature in °C" up the side in twos from 0 to 24.
- Six prediction cards (below), large enough for the class to see.
- Pencils and coloured pencils.
- For blind or low-vision children: tactile or large-print copies of the tables, and card squares with sticky backs for the bar graph.

The Little Hill season table

Made-up data for the made-up town of Little Hill: what a month in each season is usually like, from many years of records. It is an example, not from a source.

Season	Usual afternoon temperature (°C)	Rainy days in a month	Snowy days in a month
Winter	4	10	3
Spring	12	8	0
Summer	22	5	0
Autumn	14	12	0

The three summers table

Made-up data: the same summer month in three different years in Little Hill.

Year	Afternoon temperature that month (°C)	Rainy days
First year	21	4
Second year	24	7

Year	Afternoon temperature that month (°C)	Rainy days
Third year	22	5

The prediction cards

Each card names a season in Little Hill and two possible tomorrows. Children choose the one that is **more likely**.

1. Winter: 3 °C or 25 °C? (3 °C.)
2. Summer: 22 °C or 2 °C? (22 °C.)
3. Winter: snow or no snow? (No snow is more likely: snow falls on about 3 days of a month, so most days have none.)
4. Autumn: a rainy day or a dry day? (A dry day is a little more likely: about 12 rainy days in a month of about 30, so about 18 dry days.)
5. Spring: 12 °C or 30 °C? (12 °C.)
6. Summer: snow or no snow? (No snow; the table shows 0 snowy days.)

Steps

✎ Opening (5 min)

Ask: "Is it warmer here in summer or in winter?" Say: "Weather changes every day, but there are **patterns**. People in Little Hill have kept weather records for many years, so they know what each **season** is **usually** like. Scientists use patterns like these to make careful guesses, called **predictions**, about what weather might happen next."

✎ Main activity (25 min)

- **Reading the season table (6 min).** Read the headings. Ask:
  - "Which season is usually warmest?" (Summer, 22 °C.)
  - "Which is usually coldest?" (Winter, 4 °C.)
  - "Which season usually has the most rainy days?" (Autumn, 12.)
  - "When does snow usually fall?" (Only in winter.)
- **Bar graph of temperatures (10 min).** Pairs draw one bar for each season and write its number on top: winter 4, spring 12, summer 22, autumn 14. Model the first bar: "4 is two squares up, because the lines go up in twos."
- **Three summers (5 min).** Look at the three summers table. "Was every summer the same?" (No: 21, 24 and 22 °C; 4, 7 and 5 rainy days.) "But were they all warm?" (Yes, all much warmer than winter's 4 °C.) Say: "That is what **usually** means. Each summer is a bit different, but the pattern stays the same."
- **Predictions (4 min).** Show the six prediction cards one at a time. Children vote for the more likely tomorrow with a thumb up for the first choice or a thumb down for the second, and one pair explains using the table.

✓ Discussion questions (5 min, with answers)

- "How many degrees warmer is summer than winter, usually?" (18 °C; 22 - 4.)

- "Which two seasons are most alike in temperature?" (Spring and autumn, 12 and 14 °C.)
- "If it is summer, could tomorrow still be cold and rainy?" (Yes, it could; it is just less likely. A prediction is a careful guess, not a promise.)
- "How could our own weather table help us one day?" (After many weeks and years, it shows what our seasons are usually like.)

✓ Closing check (5 min, with answers)

Each child writes or says one sentence for each:

1. "In Little Hill, winter is usually..." (Cold, about 4 °C, sometimes snowy; any answer that fits the table.)
2. "In Little Hill, summer is usually..." (Warm, about 22 °C, with fewer rainy days; any answer that fits the table.)
3. True or false: "Every summer in Little Hill is exactly 22 °C." (False; the summers were 21, 24 and 22 °C.)

Vocabulary

season, winter, spring, summer, autumn (fall), usually, pattern, predict, prediction, likely

Differentiation

- **More help:** draw only the summer and winter bars; use the words "warm" and "cold" before numbers.
- **More challenge:** make a second bar graph of rainy days in each season, or work out how many dry days there usually are in an autumn month of 30 days (18).
- Children may answer the prediction cards by pointing, signing or using AAC.

⚠ Safety

- No special hazards.

Teacher notes and misconceptions

- Some children think a prediction is always right, or that a wrong forecast means scientists "lied". Stress "careful guess using patterns".
- "Fall" and "autumn" mean the same season; use the word your school uses.
- Seasons fall in different months in different parts of the world (see Known gaps in the unit overview). Do not teach the months of each season as a fact for everyone.
- Little Hill numbers are made up. Real records for your area may be online from your national weather service; a teacher may compare them in a later lesson.

Lesson 4: Climates around the world

Unit overview - Previous: What is each season usually like? - Next: Keeping flood water out

Back to the grade 3 year plan

Goal

Children learn the difference between weather and climate, and combine a picture card and a fact card to describe three very different climates in the world, finding where each is usually found on a globe.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5.

Materials

- A globe and a world map.
- Three A4 climate picture cards, drawn or printed by the teacher (described below), each with a title.
- Three climate fact cards (below), read aloud by an adult.
- The Little Hill season table from lesson 3.
- For each group of 4-5: a "climate clues" sheet with three boxes, one for each climate, and two lines in each box: "From the picture we found..." and "From the fact card we found...".
- Pencils; the class weather table.
- For blind or low-vision children: tactile climate cards (for example a damp leafy texture for the rainforest, dry sand for the desert, cold smooth plastic and short soft moss-like felt for the tundra), and a globe with a raised line round the middle (string or tape) for the equator.

The climate cards

The picture cards show land and weather only, with no people, so that nobody is shown as a stereotype. The fact cards use words from Wikipedia (see Sources in the unit overview), made simpler for grade 3.

- **Picture card A, tropical rainforest climate:** tall green trees close together, rain falling, a wet muddy path. **Fact card A:** "It is warm all year. It is very damp. Rain falls all through the year, and there is no dry season. This climate is usually found near the equator."
- **Picture card B, desert climate:** sand and rocks, very few plants, a clear blue sky. **Fact card B:** "It is dry. Very little rain falls, and the rain that does fall dries up quickly. The ground is often bare rock or sand. Some deserts are hot and some are cold."
- **Picture card C, tundra climate:** flat land with low plants and moss, patches of snow, a grey sky. **Fact card C:** "It is cold. Even in the warmest month it is never more than 10 °C, but there is at least one month warm enough to melt snow. Not much rain or snow falls. This climate is found far to the north or south, near the cold ends of the globe, and high up on mountains."

Steps

✎ Opening (5 min)

Look at today's row in the class weather table. Say: "This is today's **weather**. Weather is what it is like outside today. **Climate** is what the weather of a place is **usually** like over many, many years, about thirty years. Little Hill's season table shows Little Hill's climate: warm summers, cold winters, rain in every season." Ask: "Is 'it is raining now' weather or climate?" (Weather.) "Is 'it usually snows here in winter' weather or climate?" (Climate.)

✎ Main activity (25 min)

- **Clue hunt (15 min).** Each group gets the three picture cards in turn (about 5 minutes each; pass them round). For each card, the group finds two clues in the picture and writes or draws them in the "From the picture" line. Then the adult reads the matching fact card aloud and the group adds one clue to the "From the fact card" line.
- **On the globe (5 min).** Together, find the equator on the globe (the line round the middle). "Fact card A says rainforest climates are usually near the equator." Point to a band near it. "Fact card C says tundra is far to the north or south, near the cold ends, and high on mountains." Point to the far north. Say: "Deserts can be in many places, hot or cold, so the fact card does not give one place."
- **Putting clues together (5 min).** Each group chooses one climate and makes two sentences that use both cards, for example "In the rainforest climate it is warm all year (fact card) and the trees are close together and green (picture)."

✓ Discussion questions (5 min, with answers)

- "Which climate gets the least rain?" (The desert.)
- "Which climate is warm all year?" (The tropical rainforest climate.)
- "Which is never warmer than 10 °C?" (The tundra.)
- "Why did we use both the picture and the fact card?" (The picture shows some things, the fact card tells things a picture cannot, such as 'all year' or 'never more than 10 °C'. Two sources together tell us more.)
- "Is Little Hill's climate most like any of these?" (Not really: it has warm summers and cold winters; any sensible answer.)

✓ Closing check (5 min, with answers)

Read each sentence. Children hold up one finger for A (rainforest), two for B (desert) or three for C (tundra), or a closed fist for "weather" if it is not about a climate:

1. "Very little rain falls, and the ground is often bare." (B, two fingers.)
2. "It rains all through the year, and it is warm." (A, one finger.)
3. "Even the warmest month is cold." (C, three fingers.)
4. "It is foggy this morning." (Weather, a fist.)

Vocabulary

climate, weather, equator, globe, tropical rainforest, desert, tundra, dry, damp, all year

Differentiation

- **More help:** use only cards A and B, which are the most different; the adult reads every clue line.
- **More challenge:** compare one climate with Little Hill's season table: what is the same and what is different?
- Groups may draw their clues instead of writing them.

⚠ Safety

- No special hazards. Do not show frightening pictures of storms or hazards in this lesson.

Teacher notes and misconceptions

- "All deserts are hot" is common. Fact card B says some are cold; this comes from the Desert climate source.
- Children may think a climate means a whole country. Many countries have more than one climate; the cards describe climate types, not countries.
- Do not add sentences about how people live in these climates, what they wear or what homes they have; the unit leaves that out on purpose (see Known gaps in the unit overview).
- The "about thirty years" in the opening comes from the Climate source.

Lesson 5: Keeping flood water out

Unit overview - Previous: Climates around the world

Back to the grade 3 year plan

Goal

Children learn that people cannot stop weather hazards but can make the harm smaller. They test two model flood barriers around a model house, keeping the water the same, and make a claim about which design works better, giving evidence from their test.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. The one-to-one assessment (see Assessment in the unit overview) happens during this lesson or the following week.

Materials

- For each group of 4-5: a shallow plastic tray or box about 30 cm long with a rim at least 5 cm high; damp washed play sand; a small wooden block or a plastic brick (the "house"); squares of paper towel about 5 cm across (one under the house for each pour, so at least three per group); a plastic jug with 200 ml of water marked on it; a pouring cup; a lump of latex-free modelling clay about the size of a tennis ball; eight lolly sticks; a book or a block about 3 cm thick to tilt the tray.
- A few spare paper towel squares.
- A results chart on the board with three rows (no barrier, lolly-stick wall, clay wall) and three columns for the paper towel: dry, damp, wet.
- Three design picture cards: a flood barrier (a low wall in front of a door and a row of sandbags), a lightning rod on a roof with a wire to the ground, and a roof tied down with strong straps.
- Aprons, cloths and a bucket for wet sand.
- For blind or low-vision children: the child feels the paper towel square after each pour (dry, a little damp, wet) and feels the barriers before pouring.

Steps

✎ Opening (5 min)

Tell families beforehand what the lesson is about. Any child may choose to be a helper or do only the tray test, with no reason needed.

Say calmly: "Sometimes weather is so strong that it can cause harm: very heavy rain can make rivers or streets flood, strong winds can lift roofs, and lightning can strike buildings. We call these **weather hazards**. People cannot stop the weather. But engineers **design** things that make the harm smaller. Today we test designs that keep flood water away from a house." Do not ask children about their own homes or experiences.

✎ Main activity (25 min)

Groups build a sand "town" in one half of the tray: a flat, low area with the house standing on a paper towel square in the middle. The "river" end is the other, empty end of the tray. Tip the tray up slightly at the river end (rest that end on the book or block) so that water poured there runs down towards the house.

- **No barrier (5 min).** Pour 200 ml of water slowly from the cup into the river end. Wait 30 seconds. Lift the house: is the paper towel dry, damp or wet? Record it. Put a new dry paper towel square under the house and smooth the sand.
- **Lolly-stick wall (8 min).** Push the eight lolly sticks side by side into the sand between the river and the house, as a wall. Pour the same 200 ml the same way, from the same place, at the same speed. Wait 30 seconds. Check the paper towel and record. Remove the sticks, change the paper towel and smooth the sand.
- **Clay wall (8 min).** Roll the clay into a long sausage and press it into the sand between the river and the house as a wall, pressing it down so there are no gaps underneath. Pour, wait, check and record as before.
- **Class chart (4 min).** Each group adds its three results to the class results chart.

✓ Discussion questions (5 min, with answers)

- "What did we keep the same each time?" (The amount of water, 200 ml; where and how fast we poured; the house; the tray and its tilt; how long we waited.)
- "Which design kept the house driest? How do you know?" (Usually the clay wall; any answer that matches the chart, with the paper towel as evidence.)
- "Make a claim: 'The ... wall is better because ...'." (For example, "The clay wall is better because the paper towel stayed dry, and water got through the gaps between the lolly sticks." Any claim with evidence from the chart.)
- "Did the barrier stop the rain?" (No; it kept water away from the house. It made the harm smaller.)
- Show the other two design cards. "What hazard does each one make less harmful?" (The lightning rod: lightning; it gives lightning a path to the ground through a wire instead of through the building. The strapped roof: strong wind; it keeps the roof from being lifted off.)

✓ Closing check (5 min, with answers)

Children answer by saying, signing or pointing:

1. "What did the barrier protect?" (The house.)
2. "Which hazard does a lightning rod help with?" (Lightning.)
3. "Did we change the amount of water between tests?" (No; it was always 200 ml.)

Then use the one-to-one assessment in the unit overview.

Vocabulary

hazard, flood, barrier, design, engineer, claim, evidence, lightning rod, fair test

Differentiation

- **More help:** test only no barrier and the clay wall; an adult pours.
- **More challenge:** design a third barrier with the same materials (for example clay pressed along the bottom of the lolly sticks) and test it the same way; or say one good and one bad thing about each design (for example, clay works well but takes longer to build).
- Children who prefer not to touch wet sand can pour, time the 30 seconds or record.

⚠ Safety

- Aprons on. Wipe spills straight away so the floor is not slippery.
- Sand stays in the trays and away from faces; wash hands afterwards.
- Check for latex and wheat allergies before using modelling clay.
- Talk about hazards calmly; no frightening pictures or stories. Any child may step out of the talk. Never ask about children's homes or experiences.

Teacher notes and misconceptions

- Some children think barriers stop the rain itself. Stress that the rain still falls; the barrier changes where the water goes.
- The lolly-stick wall usually leaks between the sticks and underneath; that is a useful result, not a failure.
- If results differ between groups, say so honestly: the sand, the tilt or the pouring may not have been quite the same. One test is not proof.
- In grade 2 the class protected a sand hill from water. Here the new idea is making a claim about which design is better, using evidence.
- The tray is a model. Real flood barriers are much larger, and real water pushes much harder.

Grade 3 Science: Life Cycles and Traits (5 lessons, about 4-5 weeks, plus a short daily watering job)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 12 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules.
>
> Text-checked by four other agents (Gemini 3.5 Flash, Gemini 3.8 Flash, Gemini 4 Argon and Gemini 4 Carbon); see Known gaps.

Back to the grade 3 year plan - Term 3. Builds on kindergarten science: Living things and their needs, grade 1 science: Plants, light and water, grade 2 science: Habitats, seeds and helpers, grade 3 science term 2: Weather over a season and the science progression

Big idea

Every plant and animal has a **life cycle**: it begins, it grows, it can make young of its own, and in the end it dies. The young grow and the same pattern starts again. Life cycles are different: a bean grows from a seed, a frog starts as an egg and lives in water as a tadpole, and a caterpillar turns into a butterfly inside a chrysalis. But they all have the same four parts: birth, growth, reproduction and death.

Young plants and animals look like their parents, but not exactly, and brothers and sisters are not exactly the same as each other. A **trait** is something about a living thing that we can observe, such as its fur colour or how tall it grows. Many traits come from the parents. Some traits can also be changed by where a living thing lives and what it gets: a bean plant that gets too little water stays small.

This is the third science unit of grade 3 (term 3). The class plants bean seeds in lesson 1 and sets up a fair comparison: half the plants get plenty of water and half get a little. The plants grow while the class learns about life cycles, and in lesson 5 the class measures them and uses the results as evidence.

Outcomes

By the end of the unit most children can:

1. Put the stages of a bean plant's life cycle in order (seed, seedling, adult plant, flowers, pods with seeds, the old plant dies) and say what happens at each stage.
2. Name the stages in the life cycles of a frog, a butterfly and a chicken, and draw one of them as a life-cycle wheel.
3. Say what every life cycle has in common (birth, growth, reproduction and death) and give one way that two life cycles are different.
4. Use a table about a made-up rabbit family to say which traits each young rabbit shares with each parent, and that no young rabbit is exactly like its parents or the others.
5. Measure bean plants grown from one packet to the nearest centimetre, record the heights in a table and a dot plot, and say that plants of the same kind are not all the same.

6. Use the results of the class water test to explain that the environment (how much water a plant gets) can change a trait (how tall it grows), giving evidence from the test.

Prior knowledge

- Kindergarten science: living things need food, water and air; plants need light and water.
- Grade 1 science: the baby plant and food store inside a soaked bean seed; a seed needs water to start growing, and a young plant needs light and water; comparing two plants with words such as "taller" and "paler".
- Grade 2 science term 3: seeds are spread by animals and wind; animals help some plants make seeds by carrying pollen.
- Grade 3 science term 2: tables, bar graphs and "usually"; a fair comparison changes only one thing.
- Mathematics: measuring length to the nearest centimetre with a ruler (grade 2); reading and making tables, tally charts and bar graphs.
- Children read short labels and numbers. Cards with more text are read aloud by an adult.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Bean plants need time to grow, so spread the lessons out: lessons 1 and 2 in week 1, lesson 3 in week 2, lesson 4 in week 3, and lesson 5 in week 4 or 5, when the plants with plenty of water are about 15-25 cm tall. From lesson 1 on, two plant helpers (a new pair each week) water the plants every school day with an adult, following the watering chart (about 3 minutes).

1. Planting a fair test: is a seed alive?; planting bean seeds in twelve cups; the "plenty of water" group and the "a little water" group; keeping everything else the same; a seed in a jar so roots can be seen; predictions.
2. The life cycle of a bean plant: looking inside a soaked bean seed again (first done in grade 1); six life-cycle picture cards in order; flowers, pollen and pods; why a life cycle is drawn as a circle; checking the seed in the jar.
3. Animal life cycles: frog, butterfly and chicken stage cards; making a life-cycle wheel; comparing the three; birth, growth, reproduction and death in every life cycle.
4. Like their parents, but not exactly: traits; the Brook Farm rabbit family table; measuring the class bean plants; a dot plot of heights; plants of the same kind are not all the same.
5. Can the environment change a trait?: measuring both groups of bean plants; a results table and a bar graph; a claim with evidence; sorting trait cards into "from the parents" and "changed by the environment"; the end-of-unit check.

Materials (whole class unless noted)

- **Lesson 1:** a packet of dwarf French bean seeds sold for growing (about 30 seeds, so there are spares); twelve clear or white plastic cups (about 250 mL) with drainage holes made by an adult, each on a saucer or tray lid; potting compost (peat-free if possible), put into the cups by an adult before the lesson; a sticky label and a marker pen for each cup (P1-P6 and L1-L6); two trays to hold the cups, labelled "Plenty of water" and "A little water"; a plastic measuring cup marked in mL (or a 5 mL spoon); a small watering can or jug; a clear jar, a paper towel and two bean seeds for the seed in a jar; the class watering chart (in Lesson 1); a magnifying glass for each pair; aprons; a pencil and a prediction slip for each pair; paper towels for spills.

- **Lesson 2:** for each pair, a bean seed soaked in water overnight by an adult, a paper plate and a magnifying glass; six bean life-cycle picture cards (seed, seedling, young plant, plant with flowers, plant with pods, dry old plant) on the board and one small set for each pair (in Lesson 2); a fresh green bean pod from a shop, to open and look at (not to eat); for each pair, a life-cycle ring sheet (six boxes in a circle joined by arrows) and a pencil; the seed in a jar; the bean cups; the watering chart; paper towels.
- **Lesson 3:** frog, butterfly and chicken stage cards (four cards each; in Lesson 3), a large set on the board and a small set of all twelve for each group of four; for each child, a blank life-cycle wheel sheet (a large circle drawn on paper, divided into four parts, with arrows round the edge), a pencil and coloured pencils; the "same and different" table on the board; the four word cards "birth", "growth", "reproduction" and "death"; the six bean cards from lesson 2; the bean cups, the seed in a jar and the watering chart; latex-free, wheat-free modelling clay for tactile modelling.
- **Lesson 4:** the Brook Farm rabbit family cards (two parent cards and four young rabbit cards with simple drawings) and the rabbit table (in Lesson 4) on the board and one copy for each pair; the bean cups from the "plenty of water" tray; for each pair, a 30 cm ruler and a pencil; a class height table and a large dot plot line marked in centimetres from 0 to 30; sticky dots or a marker for the dot plot; the Brook Farm bean table (in Lesson 4), in case the class plants have not grown; the frog and chicken stage cards from lesson 3; the watering chart.
- **Lesson 5:** all twelve bean cups; for each pair, a 30 cm ruler and a pencil; the class results table on the board and one copy for each pair; for each pair, a blank bar graph sheet (twelve plants along the bottom, height in cm up the side in twos from 0 to 30) and coloured pencils; the Brook Farm results table (in Lesson 5), in case the class plants have not grown well; the prediction slips from lesson 1; the claim frame on the board; eight trait sort cards and two heading cards ("From the parents", "Changed by the environment"); the rabbit table from lesson 4, the bean and frog cards and the class dot plot for the end-of-unit check; the watering chart.
- **For blind or low-vision children (all lessons):** tactile picture cards (raised outlines made with glue lines or wiki sticks, with a Braille or large-print label); a ruler with raised marks every centimetre or a talking tape measure; plants can be felt gently, leaves held between finger and thumb; large-print tables.

⚠ Safety and access

- **Seeds.** Never eat seeds, and never drink the soaking water. Seeds sold for growing can be treated with chemicals, and raw beans contain a toxin: "Symptoms can be induced from as few as four to five raw beans" (Wikipedia, for raw red kidney beans, the same species as the French bean). Adults hand out seeds and count them back in. Wash hands after handling seeds.
- **Allergies.** Beans are legumes, like peas and peanuts. Check with families and the school nurse before the unit. A child with a legume allergy does not touch the seeds, pods or plants unless the school nurse says it is safe; they can be the recorder, the measurer's reader or the watering chart keeper. The fresh pod in lesson 2 is only for looking at.
- **Compost.** An adult opens the bag and fills the cups before lesson 1, outside or in an airy place, without shaking up dust. Children wear aprons, keep compost away from faces and wash hands after touching it.
- **Water.** Wipe spills at once so the floor is not slippery. Put the trays where they cannot be knocked off.

- **Living animals.** This unit uses pictures only. Never collect frogspawn, tadpoles, caterpillars or eggs from the wild; in some places it is against the law, and the animals can die.
- **Death and feelings (lessons 2, 3 and 5).** Some children may have lost a pet or a person. Talk about death in the life cycle calmly and briefly, as something that happens to every living thing. Never ask children about their own pets, families or losses. Any child may sit out the talk and help with the cards instead. If some plants in the "a little water" group wilt or die, say so plainly: that is a result.
- **Families and bodies.** The unit does not cover human reproduction (the standard says the same), and the trait examples are plants and animals only. Never compare children's own traits, bodies or heights, and never ask which traits a child got from which family member.
- Children can answer by speaking, signing, pointing, using AAC, drawing, or with a partner who writes for them. Their own way counts.
- Deaf children: show every card and table while it is described; face the class when reading cards aloud. Blind and low-vision children: use the tactile materials above; a partner reads numbers aloud.
- Colour is never the only clue: the two trays have word labels and letters (P and L), bars on graphs have labels, and the rabbit cards have words as well as drawings.
- Wheelchair users: put the plant trays on a table they can reach; bring a cup to the child for measuring.
- Finger-free measuring: a partner holds the ruler and the child says when the top of the plant lines up, or reads a talking tape measure.

Assessment

Watch and listen during lessons, and use the closing checks. During lesson 5 or the following week, see each child for about 3 minutes with the materials listed (answers in brackets):

1. Give the child the six bean life-cycle cards, mixed up. "Put them in order. What happens at the end?" (Seed, seedling, young plant, plant with flowers, plant with pods, dry old plant; the old plant dies, and the seeds in the pods can grow into new plants.) (Outcome 1.)
2. Give the child the four frog cards, mixed up. "Put them in order and name the stages." (Egg, tadpole, froglet, adult frog.) (Outcome 2.)
3. "What do the life cycles of a frog and a chicken have in common?" (Both are born, grow, can make young and die; both start as eggs.) "What is one difference?" (A tadpole lives in water and changes shape a lot; a chick looks like a small hen; any correct difference.) (Outcome 3.)
4. Show the Brook Farm rabbit table from lesson 4. "Look at Bramble. Which parent is Bramble like? Is Bramble exactly like either parent?" (Brown fur like Hazel; floppy ears and no nose spot like Pip; no, Bramble is not exactly like either one.) (Outcome 4.)
5. Show the class dot plot from lesson 4 (or the Brook Farm bean table). "All these plants came from one packet. Are they all the same height? Is that surprising?" (No, they are different heights; plants of the same kind are not all the same.) (Outcome 5.)
6. Show the class results table from lesson 5. "Which group grew taller? What made the difference? How do you know?" (Usually the plenty-of-water group; the water was the only thing that was different, so the water made the difference; any answer that matches the class's own results and uses them as evidence.) (Outcome 6.)

Sources

Quoted exactly; the unit is not a full alignment to these standards.

- Next Generation Science Standards, grade 3, Inheritance and Variation of Traits: Life Cycles and Traits: https://www.nextgenscience.org/topic-arrangement/3inheritance-and-variation-traits-life-cycles-and-traits
    - 3-LS1-1: "Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death." Clarification statement: "Changes organisms go through during their life form a pattern." Assessment boundary: "Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction."
    - 3-LS3-1: "Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms." Clarification statement: "Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans." Assessment boundary: "Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples."
    - 3-LS3-2: "Use evidence to support the explanation that traits can be influenced by the environment." Clarification statement: "Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; and, a pet dog that is given too much food and little exercise may become overweight."
    - LS1.B: "Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles."
    - LS3.A: "Many characteristics of organisms are inherited from their parents." "Other characteristics result from individuals’ interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment."
    - LS3.B: "Different organisms vary in how they look and function because they have different inherited information." "The environment also affects the traits that an organism develops."
- Wikipedia (lead paragraphs, read 2026-11-12):
    - Germination: "Germination is the process by which an organism grows from a seed or spore."
    - Pollination: "Pollination is the transfer of pollen from an anther of a plant to the stigma of a plant, later enabling fertilisation and the production of seeds. Pollinating agents can be animals such as insects, for example bees, beetles or butterflies; birds, and bats; water; wind; and even plants themselves."
    - Fruit: "In botany, a fruit is the seed-bearing structure in flowering plants (angiosperms) that is formed from the ovary after flowering."
    - Tadpole: "A tadpole or polliwog (also porwigle) is the larval stage in the biological life cycle of an amphibian."
    - Pupa: insects with a pupal stage "go through four distinct stages in their life cycle, the stages thereof being egg, larva, pupa and imago (adult)", and "The pupae of different groups of insects have different names such as chrysalis for the pupae of butterflies".
    - Phytohaemagglutinin: it "is found in the highest concentrations in uncooked red kidney beans (Phaseolus vulgaris)"; "Symptoms can be induced from as few as four to five raw beans."

Known gaps and cautions

- Four other agents (Gemini 3.5 Flash, Gemini 3.8 Flash, Gemini 4 Argon and Gemini 4 Carbon, all at 067e8fa) text-checked this unit on 2026-11-12. Three reported no errors; Carbon reported three small fixes (a wrong grade 2 term number, the seed in a jar missing from lesson 3 materials, and the end-of-unit check items missing from lesson 5 materials), now fixed. Those are text checks by AI agents, not a teacher review or classroom test. No teacher has reviewed or tried it.
- The Brook Farm rabbit family, the Brook Farm bean tables and all names in them are made up for this unit. They are examples, not data from a source. They are there in case the class plants grow badly or slowly.
- The watering amounts (20 mL every school day for the "plenty" group, and 20 mL on Mondays only for the "a little" group) are my starting suggestion, not from a source. Cups, compost and classrooms differ: if the "plenty" cups stand in water, give less; if the "a little" plants all die in the first week, give the "a little" group 20 mL twice a week and record the change. Holidays and weekends need a plan.
- Bean seeds usually come up in one to two weeks in a warm room, but not every seed grows. Two seeds go in each cup; if both grow, measure the taller one and say so in the results.
- The source's second example of the environment changing a trait (a pet dog that becomes overweight) is not used, so that the class does not talk about bodies and weight. The unit uses only the plant example.
- 3-LS3-1 asks for evidence that traits are inherited from parents. The unit shows patterns in a made-up table; it does not explain how inheritance works (the standard's assessment boundary leaves this out too).
- Other grade 3 life-science standards (3-LS2-1 groups of animals, and 3-LS4-1 to 3-LS4-4 fossils, survival, habitats and change) are not in this unit.
- "Birth" for a plant is explained as the seed starting to grow (germination). This is my wording for young children, not a quotation.
- The frog, butterfly and chicken stage descriptions are simplified. Some frogs skip the tadpole stage (the Wikipedia tadpole article says so), and the unit mentions this only in the teacher notes.

Lesson 1: Planting a fair test

Unit overview - Next: The life cycle of a bean plant

Back to the grade 3 year plan

Goal

Children plant bean seeds in twelve cups and set up a fair comparison: six cups will get plenty of water and six will get a little water, and everything else stays the same. They write a prediction, and they set up a seed in a jar so that the roots can be seen.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5.

Materials

- A packet of dwarf French bean seeds sold for growing (about 30 seeds, so there are spares). An adult hands out the seeds and counts them back in.
- Twelve clear or white plastic cups (about 250 mL), each with three small drainage holes in the bottom made by an adult, and each on a saucer or tray lid. An adult fills them with potting compost (peat-free if possible) to about 2 cm from the top before the lesson.
- A sticky label and a marker pen for each cup. Labels: P1, P2, P3, P4, P5, P6 ("plenty") and L1, L2, L3, L4, L5, L6 ("a little").
- Two trays to hold the cups, with word labels: "Plenty of water" and "A little water".
- A plastic measuring cup marked in mL, or a 5 mL spoon (four spoons make 20 mL).
- A small watering can or jug of water.
- For the seed in a jar: a clear jar (plastic if possible), a paper towel and two bean seeds.
- The class watering chart on a large sheet (below).
- A magnifying glass for each pair.
- Aprons for everyone.
- For each pair: a prediction slip and a pencil.
- Paper towels for spills.
- For blind or low-vision children: a ruler with raised marks; a cup with a raised label (a sticky dot for P, two for L).

The class watering chart:

Day	"Plenty of water" cups P1-P6	"A little water" cups L1-L6
Monday	20 mL each	20 mL each
Tuesday	20 mL each	none
Wednesday	20 mL each	none
Thursday	20 mL each	none
Friday	20 mL each	none

The prediction slip: "We think the plants with _____ water will grow taller, because _____." Children can draw instead of writing.

Steps

✎ Opening (5 min)

1. Hold up one bean seed. Ask: "Is this alive?" Let children talk to a partner, then share. Accept all answers.
2. Explain: "A seed is alive, but it is waiting. Inside it is a tiny baby plant and a store of food. When it gets water and warmth, it starts to grow. Scientists call this **germination**. In this unit we will watch bean plants start their lives, and learn about the lives of animals too."
3. Pass round seeds for pairs to look at with magnifying glasses. Remind everyone: "We never eat seeds or put them in our mouths. Some raw beans can make people ill."

✎ Main activity (25 min)

1. **Our question.** Write on the board: "Does the amount of water change how tall a bean plant grows?" Ask: "How could we find out?" Take ideas.
2. **A fair test.** Explain: "We will grow two groups of plants. One group gets plenty of water and one group gets only a little. To be fair, only the water is different. What else must stay the same?" Collect ideas and write them as a list: the same kind of seed (from one packet), the same compost, the same size of cup, the same window and light, the same warm room, the same number of seeds in each cup.
3. **Labelling.** Give each pair one cup. (With 12 pairs, every pair has a cup; with fewer, some pairs have two; with more, two pairs share.) The teacher hands out labels P1 to P6 and L1 to L6. Pairs stick the label on their cup and put it in the right tray: P cups in the "Plenty of water" tray, L cups in the "A little water" tray.
4. **Planting.** An adult gives each pair two seeds. Show how to plant: make a hole with one finger about 3 cm deep (about as deep as the first joint of a finger), drop in one seed, cover it. Do the same for the second seed on the other side of the cup. "Why two seeds?" (In case one does not grow.)
5. **The first watering.** Every cup gets 20 mL today, so that every seed can start. The teacher or a helper measures it. Show the class how much 20 mL looks like in the measuring cup.
6. **The watering chart.** Show the chart and read it together. Ask: "Which group gets water every day? Which gets water only on Mondays?" Choose the first two plant helpers. Explain that they will water with an adult each school day, and tick the chart.
7. **A seed in a jar.** While pairs wash their hands, the teacher folds a damp paper towel round the inside of the jar and pushes two seeds between the towel and the glass, about halfway down. Put 2 cm of water in the bottom so the towel stays wet. "In this jar we can see what happens under the ground."
8. **Predictions.** Pairs fill in the prediction slip. Collect the slips to look at again in lesson 5.

Put both trays side by side at the same window, where they will not be knocked.

✓ Discussion questions (5 min)

- "Why do both trays go at the same window?" (So that light is the same for both groups; only the water is different.)

- "If we put the 'plenty' cups in a warm room and the 'a little' cups in a cold room, would our test be fair?" (No. Then two things would be different, and we would not know which one made the difference.)
- "What do you think will happen to the seed in the jar first?" (Accept predictions. Usually a root comes out first.)

✓ Closing check (5 min)

Ask each question; children answer with thumbs up or down, or in their own way (pointing, signing, AAC).

1. "Our test changes only one thing. Is that thing the water?" (Yes.)
2. "Do the L cups get water every day?" (No, only on Mondays, after the first watering today.)
3. "Is a seed alive?" (Yes. It has a tiny baby plant inside that can grow.)
4. "Can we eat the seeds?" (No, never.)

Vocabulary

seed, germination, fair test, prediction, compost, millilitre (mL)

Differentiation

- **Support:** give the prediction slip with the two choices drawn ("plenty" as a full jug, "a little" as a jug with a drop) to circle. Pair a child who needs help with planting with a confident partner.
- **Stretch:** "What other things could we test, one at a time?" (For example light or warmth.) Write one as a new fair-test question.
- **Tactile:** blind or low-vision children find their cup by the raised label and feel the depth of the hole with a finger before dropping the seed in.

⚠ Safety

- Never eat seeds or put them in mouths. An adult counts seeds out and back.
- Adults make the drainage holes and fill the cups with compost before the lesson, outside or in an airy place, without shaking up dust. Aprons on; keep compost away from faces; everyone washes hands after planting.
- Check for allergies to beans, peas or peanuts before the lesson. A child with a legume allergy does not touch seeds; they can label cups, read the chart or measure the water.
- Wipe spills straight away.

Teacher notes and misconceptions

- **"Seeds are not alive."** Many children think seeds are like stones. The seed in a jar helps: when a root comes out, ask "Could a stone do that?"
- **Fair tests.** Children often want to change many things at once. Keep returning to "What is the one thing we are changing?"

- **The watering amounts** are a starting suggestion (see Known gaps in the unit overview). If water stands in the saucers of the P cups, give less and write the change on the chart. Honest changes are part of science.
- **Weekends and holidays.** Plants in the P group may dry out over a long break. Ask an adult to water on the last day before a break and the first day back, and note it on the chart.
- Keep the spare seeds in their packet, out of reach, in case some cups do not grow. Seeds that have not come up after two weeks can be replaced; write this down.

Lesson 2: The life cycle of a bean plant

Unit overview - Previous: Planting a fair test - Next: Animal life cycles

Back to the grade 3 year plan

Goal

Children look inside a soaked bean seed again, put six picture cards of a bean plant's life in order, and learn why a life cycle is drawn as a circle: the old plant makes seeds, and the seeds grow into new plants.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5.

Materials

- For each pair: a bean seed (from the same packet) soaked in water overnight by an adult, a paper plate and a magnifying glass.
- Six bean life-cycle picture cards (below), large on the board, and one small set for each pair. The teacher draws them simply, or uses photographs the school has permission to use. Each card has a picture and a label.
- A fresh green bean pod from a shop, to open and look at (not to eat).
- For each pair: a life-cycle ring sheet (six empty boxes in a circle, joined by arrows going round) and a pencil.
- The seed in a jar from lesson 1.
- The two trays of bean cups and the watering chart.
- Paper towels.
- For blind or low-vision children: tactile versions of the six cards (raised outlines with a Braille or large-print label) and a ring sheet with raised boxes and arrows.

The six bean life-cycle picture cards:

Picture	Label
a bean seed	Seed
a seed with a root and a small shoot with two leaves	Seedling
a bigger plant with many leaves	Young plant
the plant with small white or pink flowers	Flowers
the plant with long green pods hanging down	Pods with seeds
a dry, brown, bent plant with dry pods	The old plant dies

The table shows the correct order, from top to bottom, then back to the seed. Put no numbers or letters on the cards, so that nothing gives the order away, and give each pair its cards shuffled.

Steps

✎ Opening (5 min)

1. Look at the seed in a jar together. Ask: "What has happened since last time?" (Usually a root has come out; maybe a small shoot.) "Which way is the root growing?" (Down.)
2. Look at the bean cups. Has anything come up yet? (Probably not yet; bean shoots usually show after one to two weeks.)
3. Say: "Today we find out about the whole life of a bean plant, from seed to seed."

✎ Main activity (25 min)

1. **Inside a seed (6 min).** Each pair gets a soaked seed on a paper plate. Show how to rub off the seed coat (the skin) with a thumb and gently open the seed into its two halves. With magnifying glasses, pairs find the tiny baby plant at one edge. Ask: "What do you remember from grade 1? What is the rest of the seed for?" (It is the food store that feeds the baby plant until it has leaves.) Everyone washes hands afterwards; the seeds go in the bin.
2. **Ordering the cards (8 min).** Give each pair a shuffled set of the six cards. "Put them in the order a bean plant lives its life." Walk round and ask pairs to explain their order.
3. **Talk it through (6 min).** Build the order together on the board, talking about each card:
    - **Seed.** The seed is waiting.
    - **Seedling.** With water and warmth, the seed starts to grow: a root goes down and a shoot goes up. This is germination. For a plant, this is its **birth**.
    - **Young plant.** The plant makes more leaves and grows taller. This is **growth**.
    - **Flowers.** The grown-up plant makes flowers. Insects such as bees can carry pollen from flower to flower, and some plants pollinate themselves. Pollen helps the flower make seeds. (Remind children of the model bee from grade 2.)
    - **Pods with seeds.** Each flower can turn into a pod. A pod is the bean plant's **fruit**: it holds the seeds. Making new seeds is the plant's **reproduction**.
    - **The old plant dies.** At the end of the season a bean plant dries up and dies. This is its **death**. But its seeds can grow into new bean plants next year.
4. **Opening a pod (2 min).** The teacher opens the fresh bean pod and shows the small seeds lined up inside. "Each of these could grow into a new bean plant." Pass it round on a paper towel to look at, not to eat.
5. **A circle (3 min).** Ask: "After the last card, what comes next?" (A seed again.) Pairs write or draw the six stages in the boxes of the ring sheet, going round with the arrows. "We draw a life cycle as a circle, because it starts again."

✓ Discussion questions (5 min)

- "Why is the life cycle a circle and not a line?" (Because the seeds from the old plant grow into new plants, and the pattern starts again.)

- "Which card shows the bean plant's birth? Which shows reproduction?" (Seedling, when the seed starts to grow; pods with seeds.)
- "Does the bean plant die before or after it makes seeds?" (After. That is why there are new bean plants each year.)
- "Is a bean pod a fruit?" (Yes, to a scientist: a fruit is the part of a flowering plant that holds the seeds.)

✓ Closing check (5 min)

Hold up two cards at a time. Children show with one or two fingers (or point) which comes first.

1. Flowers and Seedling. (Seedling first.)
2. Pods with seeds and Flowers. (Flowers first.)
3. Young plant and Seed. (Seed first.)
4. "What comes after 'The old plant dies'?" (A seed grows into a new plant; the cycle starts again.)

Vocabulary

life cycle, seed coat, seedling, germination, flower, pollen, pod, fruit, birth, growth, reproduction, death

Differentiation

- **Support:** give only four cards first (seed, seedling, flowers, pods), then add the other two.
- **Stretch:** "A sunflower and a bean are both flowering plants. Would a sunflower's life cycle have the same stages?" (Yes: seed, seedling, plant, flower, seeds, the old plant dies; the flowers and seeds look different.)
- **Tactile:** use the tactile cards and the raised ring sheet. A blind child can feel the two halves of the soaked seed and the tiny bump of the baby plant.

⚠ Safety

- Never eat seeds, pods or soaking water. Soaked seeds go in the bin after the lesson. Wash hands afterwards.
- Allergies: a child with a legume allergy does not touch the seeds or the pod unless the school nurse says it is safe. They can be the card checker for their pair.
- Talk about the death of the old plant calmly and briefly. Do not ask about pets or people.

Teacher notes and misconceptions

- **"Fruit means something sweet."** Children often think only sweet things are fruit. To a scientist, a bean pod, a pea pod and a tomato are all fruits, because they hold seeds.
- **"Plants come from the soil."** Remind children that each plant in their cups came from a seed they planted.

- **The baby plant inside the seed** is small and easy to miss. Show it on one seed under a magnifying glass first. If seeds will not open, soak them for longer.
- Some plants (for example many trees) live for many years and make seeds again and again before they die. The bean is a simple example because its whole life cycle fits into one season.

Lesson 3: Animal life cycles

Unit overview - Previous: The life cycle of a bean plant - Next: Like their parents, but not exactly

Back to the grade 3 year plan

Goal

Children put the stages of a frog, a butterfly and a chicken in order, draw one as a life-cycle wheel, and compare the three. They find that the life cycles are different, but every one has birth, growth, reproduction and death.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5.

Materials

- Animal stage cards (below): four frog cards, four butterfly cards and four chicken cards. One large set for the board, and one small set of all twelve for each group of four children. Each card has a picture and a label. The teacher draws them simply, or uses photographs the school has permission to use.
- For each child: a blank life-cycle wheel sheet (a large circle divided into four parts, with arrows going round the edge), a pencil and coloured pencils.
- The "same and different" table drawn on the board (below).
- Four word cards: "birth", "growth", "reproduction", "death".
- The six bean life-cycle cards from lesson 2.
- The bean cups, the seed in a jar and the watering chart.
- For blind or low-vision children: tactile versions of the stage cards (raised outlines with a Braille or large-print label) and a wheel sheet with raised lines; modelling clay (latex-free and wheat-free) to make the stages instead of drawing them.

The animal stage cards (in the correct order; give them to groups shuffled, with no numbers on them):

Frog	Butterfly	Chicken
Eggs (frogspawn in water)	Egg (on a leaf)	Egg
Tadpole (lives in water, swims with a tail)	Caterpillar (eats leaves and grows)	Chick (just hatched, fluffy)
Froglet (has legs and a short tail)	Chrysalis (a hard case; the caterpillar changes inside)	Young chicken (growing feathers)
Adult frog (can lay eggs)	Adult butterfly (can lay eggs)	Adult hen (can lay eggs)

The "same and different" table (fill it in together):

Question	Frog	Butterfly	Chicken
Does it start as an egg?			
Does the young one look like the adult?			

Question	Frog	Butterfly	Chicken
Does it change shape a lot as it grows?			
Does the young one live in water?			

Steps

✎ Opening (5 min)

1. Hold up the bean cards in order, quickly. "Last time we learned the bean plant's life cycle. Do animals have life cycles too?" Take ideas.
2. Check the bean cups and the seed in a jar together. Has anything come up? Note it on the board with today's date.

✎ Main activity (25 min)

1. **Sorting (8 min).** Give each group of four a shuffled set of the twelve animal cards. "First sort the cards into three animals. Then put each animal's cards in order." Walk round and ask groups to explain.

2. **Talk it through (7 min).** Build the three life cycles on the board, one column for each animal, talking about each stage:

    - **Frog.** A frog lays many eggs in water, called frogspawn. A tadpole hatches out. It lives in water and swims with its tail, like a small fish. It slowly grows legs and becomes a froglet, and its tail gets shorter. The adult frog can live on land and in water, and lays eggs. Scientists call a big change of shape like this **metamorphosis**.
    - **Butterfly.** A butterfly lays eggs on a leaf. A caterpillar hatches and eats and eats, growing bigger. Then it makes a hard case called a chrysalis. Inside, its body changes completely. An adult butterfly comes out, and it can lay eggs.
    - **Chicken.** A hen lays an egg. A chick grows inside and hatches out. It already looks a bit like a small chicken. It grows feathers and gets bigger, and the adult hen can lay eggs.

3. **Life-cycle wheels (10 min).** Each child chooses one of the three animals (or the bean) and draws its life cycle on a wheel sheet: one stage in each part, going round with the arrows, with a label for each stage. "Why does the arrow go back to the start?" (The adult lays eggs, and the cycle starts again.)

✓ Discussion questions (5 min)

Fill in the "same and different" table together, one row at a time. (Answers: starts as an egg: yes, yes, yes. Young one looks like the adult: no, no, a little. Changes shape a lot: yes, yes, no. Young one lives in water: yes, no, no.)

Then put up the four word cards: birth, growth, reproduction, death.

- "Where is the birth in each life cycle?" (When the young one hatches from the egg; for the bean, when the seed starts to grow.)

- "Where is the growth?" (Tadpole to frog; caterpillar getting bigger; chick to hen; seedling to plant.)
- "Where is the reproduction?" (The adult lays eggs; the bean plant makes seeds.)
- "What happens at the end of every life cycle?" (Death. Every living thing dies in the end. Some live a short time and some live many years. Its young carry on the cycle.)

✓ Closing check (5 min)

Ask each question. Children answer by pointing to a card on the board, or in their own way.

1. "Point to the stage that comes after the tadpole." (Froglet.)
2. "Point to the stage that comes before the adult butterfly." (Chrysalis.)
3. "Which animal's young looks most like its parent?" (The chicken.)
4. "Name one thing all these life cycles have." (Any of: birth, growth, reproduction, death; or "they go round in a circle".)

Vocabulary

life cycle, frogspawn, tadpole, froglet, caterpillar, chrysalis, hatch, metamorphosis, birth, growth, reproduction, death

Differentiation

- **Support:** give a group one animal's four cards at a time. Give the wheel sheet with the stage labels already written, to draw pictures beside.
- **Stretch:** "Is a tadpole a fish?" (No. It looks a bit like one and lives in water, but it is a young frog.) Or: add a fourth column to the table for the bean plant.
- **Tactile:** use the tactile stage cards. Children can model each stage with clay instead of drawing (an egg, a tadpole with a tail, a froglet with legs, a frog).

⚠ Safety

- Pictures only: never collect frogspawn, tadpoles, caterpillars or eggs from the wild. In some places it is against the law, and the animals can die.
- Check the clay for latex and wheat (some home-made dough contains wheat).
- Talk about death calmly and briefly, as part of every life cycle. Never ask children about their own pets or losses. Any child may sit out and sort the cards instead.
- This lesson is about animals only. If children ask about people, say simply that people have a life cycle too (babies grow into adults), and move on; the details of human reproduction are not part of this unit.

Teacher notes and misconceptions

- **"A caterpillar and a butterfly are different animals."** Many children think this. The cards help: it is one animal at two stages of its life.
- **"A chick grows from the yolk like a seed."** Keep it simple: a chick grows inside the egg and hatches out. Eggs from a shop do not have chicks in them.

- **Not every frog has tadpoles.** A few kinds of frog hatch from the egg as tiny froglets. The frog here is a common example, not the only kind.
- The words "larva" and "pupa" are the scientific names for the caterpillar and chrysalis stages. Use them for stretch only.
- The stages are simplified: real animals change little by little, and the cards show only four moments.

Lesson 4: Like their parents, but not exactly

Unit overview - Previous: Animal life cycles - Next: Can the environment change a trait?

Back to the grade 3 year plan

Goal

Children learn what a trait is. They use a table about a made-up rabbit family to find which traits the young share with each parent, and see that no young rabbit is exactly like its parents or the others. Then they measure the class bean plants and see that plants from one packet are not all the same height.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5.

Materials

- The Brook Farm rabbit family: six cards (two parents and four young rabbits), each with a simple drawing and the rabbit's name and traits in words. One large set for the board.
- The Brook Farm rabbit table (below) on the board, and one copy for each pair.
- The six bean cups from the "Plenty of water" tray (P1-P6).
- For each pair: a 30 cm ruler and a pencil.
- The class height table on the board (two columns: cup, height in cm).
- A large dot plot line on the board or on paper, marked in centimetres from 0 to 30, and sticky dots or a marker.
- The Brook Farm bean table (below), in case the class plants have not grown yet.
- The frog and chicken stage cards from lesson 3 (for the opening).
- The watering chart.
- For blind or low-vision children: tactile rabbit cards (fur texture for colour: smooth fabric for white, rough fabric for brown; ears made of card that stand up or hang down; a raised dot for the nose spot); a ruler with raised marks or a talking tape measure; a dot plot made with pins or stickers on a corkboard so it can be felt.

The Brook Farm rabbit table (made up for this unit):

Rabbit	Fur colour	Ears	White spot on nose	Tail
Hazel (parent)	brown	stand up	yes	white
Pip (parent)	white	floppy	no	white
Bramble (young)	brown	floppy	no	white
Clover (young)	white	stand up	yes	white
Fern (young)	brown	stand up	no	white
Moss (young)	white	floppy	yes	white

The Brook Farm bean table (made up; ten bean plants from one packet, all given plenty of water, measured after three weeks):

Plant	1	2	3	4	5	6	7	8	9	10
Height (cm)	9	12	10	14	11	12	13	10	12	11

Steps

✎ Opening (5 min)

1. Hold up the frog cards. "Does a baby frog look like its parents?" (Not at first; a tadpole looks very different. An adult frog looks like its parents.) "Does a chick look like its parents?" (Quite a lot.)
2. Explain: "Something we can observe about a living thing, like its colour, its shape or how tall it grows, is called a **trait**. Today we look at which traits young animals and plants share with their parents."

✎ Main activity (25 min)

1. **The rabbit family (10 min).** Put up the rabbit cards and the table. Read the table together: Hazel and Pip are the parents, and Bramble, Clover, Fern and Moss are their young. Pairs answer, using their copy of the table:
    - "Which young rabbits have brown fur like Hazel?" (Bramble and Fern.)
    - "Which young rabbits have floppy ears like Pip?" (Bramble and Moss.)
    - "Which young rabbits have a white spot on the nose like Hazel?" (Clover and Moss.)
    - "Which trait do all six rabbits share?" (A white tail.)
    - "Is any young rabbit exactly the same as Hazel? As Pip? As each other?" (No. Each young rabbit has some traits like Hazel and some like Pip, and no two are the same.)
2. **Measuring the bean plants (10 min).** Bring out the six P cups. Show how to measure: stand the ruler on the compost next to the stem, with 0 at the compost, and read the number at the top of the highest leaf or the tip of the shoot, to the nearest centimetre. If two seeds grew in a cup, measure the taller one. Two pairs measure each cup, one after the other, and compare: "Did you get the same number? If not, measure again together." Write each height in the class height table. (Measure only the P cups today; the L cups wait until lesson 5.)
3. **A dot plot (5 min).** Each pair puts a dot above their plant's height on the dot plot line. If two plants have the same height, the second dot goes above the first. If the class plants have not grown yet, use the Brook Farm bean table instead.

✓ Discussion questions (5 min)

- "All these bean plants came from one packet and had the same water, light and compost. Are they all the same height?" (No. Usually they are different.)
- With the Brook Farm table: "What is the tallest? The shortest? Which height is most common?" (14 cm; 9 cm; 12 cm, three plants.)

- "Why might plants from one packet be different?" (Each seed is a little different, just as the young rabbits are; and small things in each cup can be different too, such as how deep the seed was planted. Scientists call differences in a group of the same kind **variation**.)
- "Are the young rabbits different from each other for the same reason?" (Partly: each one got a different mix of traits from its parents.)

✓ Closing check (5 min)

Ask each question; children answer on fingers, by pointing to the table, or in their own way.

1. "How many young rabbits have stand-up ears?" (2: Clover and Fern.)
2. "Is Moss exactly like Pip?" (No. Moss has white fur and floppy ears like Pip, but a white nose spot like Hazel.)
3. "Look at the Brook Farm bean table. How many centimetres taller is the tallest plant than the shortest?" (5 cm: 14 - 9 = 5.)
4. "What is a trait?" (Something we can observe about a living thing, such as its colour, shape or height.)

Vocabulary

trait, parent, young, similar, variation, centimetre, dot plot

Differentiation

- **Support:** use only two traits from the rabbit table (fur colour and ears). Hold the ruler steady for the child and let them read the number.
- **Stretch:** "Hazel and Pip have more young next year. Could one have brown fur and floppy ears? Could one have spotted fur?" (Brown fur and floppy ears is a mix we have already seen in Bramble. Spotted fur is not in the table, so we cannot tell from this table. This table is made up and too small to predict from.)
- **Tactile:** use the tactile rabbit cards: feel the fur texture, the ears and the nose dot. A blind child measures with a talking tape measure or a raised-mark ruler, with a partner checking the reading.

⚠ Safety

- Handle the plants gently: hold the ruler next to the stem, not against it.
- Wash hands after touching compost.
- Use only the made-up rabbit family and the plants. Never ask children which traits they got from which family member, and never compare children's own looks or heights. Some children are adopted, fostered or live with other family, and this is a private matter.

Teacher notes and misconceptions

- **"The young are always a half-and-half mix."** Children may expect each young rabbit to be exactly between the parents (for example light brown). The table shows that traits often come in whole: brown or white, not a mixture. This is a pattern in a made-up table, not a rule; real families vary.
- **"All plants of one kind are the same."** The dot plot helps: the plants are the same kind, but not the same height.
- The standard leaves out how inheritance works and predicting traits. Keep to observing patterns. The stretch question is about why we cannot predict from a small made-up table.
- If two pairs measure the same cup differently, that is useful: talk about where to put 0 and which leaf counts as the top.

Lesson 5: Can the environment change a trait?

Unit overview - Previous: Like their parents, but not exactly

Back to the grade 3 year plan

Goal

Children measure both groups of bean plants, record the results in a table and a bar graph, and use them as evidence for a claim: the amount of water (part of the environment) changed how tall the plants grew. They sort trait cards into traits that come from the parents and traits changed by the environment.

Length

About 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5.

Teach this lesson in week 4 or 5, when most plants in the "Plenty of water" group are about 15-25 cm tall.

Materials

- All twelve bean cups (P1-P6 and L1-L6) in their two trays.
- For each pair: a 30 cm ruler and a pencil.
- The class results table on the board (below), and one copy for each pair.
- For each pair: a blank bar graph sheet (the twelve cups P1-P6 and L1-L6 along the bottom, height in cm up the side in twos from 0 to 30) and coloured pencils.
- The Brook Farm results table (below), in case the class plants have not grown well.
- The prediction slips from lesson 1.
- The claim frame on the board (below).
- Eight trait sort cards (below) and two heading cards: "From the parents" and "Changed by the environment". One large set for the board; one small set for each group of four.
- For the end-of-unit check: the rabbit table from lesson 4, the bean and frog cards, and the class dot plot.
- The watering chart.
- For blind or low-vision children: a ruler with raised marks or a talking tape measure; a bar graph made from stacks of interlocking cubes (one cube for every 2 cm) so that it can be felt; tactile or large-print sort cards.

The class results table:

Cup	P1	P2	P3	P4	P5	P6	L1	L2	L3	L4	L5	L6
Height (cm)												

The Brook Farm results table (made up; six plants with plenty of water and six with a little water, from one packet, measured after four weeks):

Cup	P1	P2	P3	P4	P5	P6	L1	L2	L3	L4	L5	L6
Height (cm)	18	21	19	22	20	20	8	10	7	9	11	9

The claim frame: "The plants with _____ water grew taller. Our evidence: _____. The only thing that was different was _____."

The eight trait sort cards (made up for this unit; the answer is in brackets and is not on the card):

1. Clover the rabbit has white fur, like Pip. (From the parents.)
2. Tibbs the Brook Farm kitten has stripes, like its mother. (From the parents.)
3. A Brook Farm lamb has a black face, like its mother. (From the parents.)
4. A sunflower grown from a seed of a yellow sunflower has yellow petals. (From the parents.)
5. A bean plant that got only a little water stayed small. (Changed by the environment.)
6. A bean plant kept in a dark shed grew pale and thin. (Changed by the environment.)
7. A bean plant on a windowsill leaned towards the window. (Changed by the environment.)
8. The Brook Farm sheepdog learned to come when the farmer whistles. (Changed by the environment: it learned it.)

Steps

✎ Opening (5 min)

1. Bring out both trays and stand them side by side. Ask: "What do you notice?" Let children talk to a partner. (Usually the P plants look taller and greener; some L plants may be small, droopy or dead.)
2. Read out two or three prediction slips from lesson 1. "Today we find out if our predictions were right, using measurements."

✎ Main activity (25 min)

1. **Measuring (8 min).** Measure every cup the same way as in lesson 4: ruler on the compost next to the stem, 0 at the compost, the top of the highest leaf or shoot, to the nearest centimetre; the taller plant if two grew. Each pair measures one cup (with fewer than 12 pairs, some measure two). If a plant has died or never came up, write 0 and a note: "did not grow". Write every height in the class results table.
2. **Bar graph (9 min).** Pairs copy the results into their own table and draw a bar for each cup on the bar graph sheet. They colour the P bars in one colour and the L bars in another, and write P or L under each bar so that colour is not the only clue. If the class plants have not grown well, use the Brook Farm results table instead, and say so.
3. **A claim with evidence (3 min).** Pairs complete the claim frame together, by writing, drawing or telling an adult. (Example with the Brook Farm table: "The plants with plenty of water grew taller. Our evidence: the shortest P plant was 18 cm and the tallest L plant was only 11 cm. The only thing that was different was the water.")
4. **Sorting traits (5 min).** Read each sort card aloud. Groups of four put each card under one of the two headings. Go through the answers together.

✓ Discussion questions (5 min)

- "Were our predictions right?" (Compare with the slips. Either answer is fine; scientists change their ideas when the evidence says so.)
- "All twelve seeds came from one packet. So why were the L plants shorter?" (Because they got less water. The water is part of their environment. The environment changed a trait: how tall they grew.)
- "Were all the P plants exactly the same height?" (Usually not. That is the variation we saw in lesson 4. But the P plants were taller as a group.)
- "Can a trait come from the parents AND be changed by the environment?" (Yes. A bean plant gets its kind of leaves and flowers from its parents, but how tall it grows also depends on its water and light.)

✓ Closing check (5 min)

Ask each question; children answer by pointing to a heading card, on fingers, or in their own way.

1. "A puppy has long ears like its father. From the parents, or changed by the environment?" (From the parents.)
2. "A plant in a dry pot grew only a few small leaves. Which?" (Changed by the environment.)
3. "In the Brook Farm table, how many centimetres taller is P4 than L4?" (13 cm: 22 - 9 = 13.)
4. "Why was our test fair?" (Only the water was different; the seeds, compost, cups, light and room were the same.)

Then see children one at a time for the end-of-unit check (see Assessment in the unit overview), during this lesson's follow-up time or the next week.

Vocabulary

environment, trait, evidence, claim, results, bar graph, inherited (stretch)

Differentiation

- **Support:** give the bar graph sheet with the P1 bar already drawn as an example. Give the claim frame with the answers as picture choices to circle (a full jug or a jug with a drop; a tall plant or a short plant).
- **Stretch:** "Some traits are **inherited**: they come from the parents. Write one more card of your own for each heading." Or: "What could we test next, keeping everything else the same?" (For example light: one tray at the window and one further away.)
- **Tactile:** use the cube bar graph: one stack of cubes for each cup, one cube for every 2 cm (rounding to the nearest cube). A blind child compares the stacks by touch.

⚠ Safety

- Handle the plants gently. Wash hands after touching compost.

- If some L plants wilted or died, say so plainly and calmly: that is a result of the test. It is fine to water all the plants well after the lesson and see whether the small ones recover.
- Use only plant and animal examples. Never compare children's own traits, bodies or heights.
- At the end of the unit, plants can be planted outside by an adult, given to the school garden, or composted.

Teacher notes and misconceptions

- **"The L plants were just bad seeds."** Ask: "Did the P seeds and the L seeds come from the same packet?" (Yes.) "Then what was different?" (The water.) This is why the fair test matters.
- **"Environment means nature or forests."** Here, a living thing's environment means everything around it and everything it gets: water, light, food, warmth, and even what it learns.
- **Results that do not match.** Sometimes one L plant grows taller than a P plant. That is real data. Look at the whole group, not one plant, and talk about why one plant might be different (a seed planted shallower, or a cup nearer the window).
- **Card 8** shows that learning counts too: the sheepdog was not born knowing the whistle. The standard's core idea says characteristics can come from the environment, "which can range from diet to learning".
- Card 6 builds on grade 1, where children saw that a plant needs light to grow green, and card 7 on the plant bending towards a window.

Grade 4 Science: Electric Circuits (5 lessons)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 4 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules.

Back to the science progression

Big idea

Electricity only does a job (lighting a bulb, sounding a buzzer) when there is a complete loop from one end of a battery, through the parts, and back to the other end. Some materials let electricity through (conductors) and some do not (insulators). A switch is just a deliberate gap we can open and close.

Outcomes

By the end of the unit a student can:

1. Build a working circuit from one cell, one bulb and two wires, and explain why it works using the word "loop" (or "complete circuit").
2. Predict and then test whether ten everyday objects are conductors or insulators, and record the results in a table.
3. Build a simple switch and show that it works wherever it is placed in a single loop.
4. Carry out a fair test (number of bulbs in a single loop vs brightness), naming the one thing changed and two things kept the same.
5. Draw a circuit with standard symbols and build a circuit from a drawing.

Prior knowledge

- Grade 3 fair test idea (change one thing, keep the rest the same).
- Sorting objects into groups and recording them in a two-column table.
- No prior knowledge of electricity is assumed.

Lessons

Lesson	Title	Main activity
1	Make it light	Find ways to light a bulb with one cell and two wires
2	Conductors and insulators	Predict, then test, ten objects in a gap in the circuit
3	Switches	Make a paper-clip switch; doorbell with a buzzer
4	A fair test: more bulbs	Does adding bulbs in one loop change brightness?
5	Drawing and designing circuits	Circuit symbols; design challenge; end-of-unit check

Materials (per group of 3-4)

- 2 × AA (1.5 V) cells in battery holders with leads. **Not** button cells, not rechargeable lithium packs, never mains power.

- 3 × small torch bulbs in holders, matched to the cells: about 1.5 V bulbs for the one-cell circuits in lessons 1-4. Two fresh AA cells give about 3 V, which is above a 2.5 V bulb's rating (it may burn out quickly), so for two-cell circuits use bulbs rated about 3-3.5 V. Keep spares.
- 1 buzzer rated for 1.5-3 V.
- 6 wires with crocodile clips.
- Paper clips, 2 brass paper fasteners (split pins), a small piece of card.
- Test objects (lesson 2): coin, plastic spoon, metal spoon, pencil (wooden end), pencil lead/graphite (see teacher note), rubber band, aluminium foil, paper, key, eraser, wooden lolly stick, glass marble.

Assessment

- Lesson 2 table and lesson 4 fair-test write-up (look for: one changed variable named, two controlled variables named, a conclusion that matches the results).
- Lesson 5 end-of-unit check: 8 questions, 16 marks, with an answer guide.

⚠ Safety (read before lesson 1)

- Only use low-voltage cells (AA or similar). **Never** experiment with wall sockets, plugs or mains appliances; the unit should say this out loud.
- **Do not use button cells.** If swallowed they can cause severe internal burns, injury or death (see the Button cell source). Keep them out of the classroom kit.
- **Short circuits:** a wire joined straight from one end of a cell to the other, with no bulb or buzzer, lets a large current flow and makes the wire and cell hot. Show students what this looks like on paper, never build it. If a wire or cell feels warm, unclip it and tell the teacher.
- Do not open, cut or bite cells. Remove cells from holders at the end of the lesson.

Sources

All checked to load on 4 November 2026.

- Wikipedia: Electric circuit
- Wikipedia: Electrical network
- Wikipedia: Electric current
- Wikipedia: Electrical conductor
- Wikipedia: Insulator (electricity)
- Wikipedia: Switch
- Wikipedia: Short circuit (overheating and fire risk)
- Wikipedia: Battery (electricity)
- Wikipedia: AA battery
- Wikipedia: Button cell (ingestion hazard)
- Wikipedia: Incandescent light bulb
- Wikipedia: Buzzer
- Wikipedia: Series and parallel circuits
- Wikipedia: Light-emitting diode (one-way behaviour, teacher note only)
- Wikipedia: Electrical injury (background for the mains warning)

Known gaps and cautions

- **Labelled simplifications:** "electricity flows round the loop" is used without explaining current, voltage or electrons; those come in grade 10. We say a cell "pushes" electricity; this is a model, not the full story.
- "Brightness" in lesson 4 is judged by eye on a 0-3 scale. This is a deliberate discussion point (it's a rough measure), not a hidden flaw.
- Parallel circuits are only mentioned as an extension; the main unit uses single loops (series).
- If you use LED bulbs instead of filament bulbs, they only work one way round; see the lesson 1 teacher note.
- No images yet; teachers will need to draw the circuits on the board.
- No standards alignment and no educator review.

Lesson 1: Make it light

Unit overview · Next: Lesson 2

Goal

Students light a bulb using one cell and two wires, and explain that it only works when there is a complete loop.

Materials (per group)

- 1 AA cell in a holder, 1 bulb in a holder, 2 crocodile-clip wires.
- Recording sheet: two boxes, "Lit" and "Not lit", for drawings.

Steps

✎ Opening (5 min)

Read the safety rules aloud (see the unit overview): cells only, never wall sockets; no button cells; never join a wire straight across a cell. Ask: "What things in your home need electricity? Which ones use batteries?"

✎ Main activity (25 min)

1. Challenge: "Make the bulb light using only these parts." Give no instructions about how.
2. Every time a group tries an arrangement, they draw it in "Lit" or "Not lit". Aim for at least two of each.
3. When most groups have a lit bulb, ask them to unclip **one** clip. What happens? Clip it back.
4. Groups compare drawings with another group: what do all the "Lit" drawings have in common?

✓ Discussion questions (with example answers)

- What do all the working circuits have in common? There is an unbroken path from one end of the cell, through the bulb, back to the other end.
- Why did the bulb go out when you unclipped one clip? The loop was broken, so electricity couldn't get all the way round.
- Does it matter which wire goes to which end of the cell? For a filament bulb, no: it lights either way round.

✓ Closing check (5 min, with answers)

Draw on the board: (a) a cell with one wire to a bulb and nothing back; (b) a full loop; (c) a loop with both wires on the same end of the cell. Which bulb lights? **Only (b).** (a) has a gap; in (c) the path doesn't go from one end of the cell to the other.

Vocabulary

cell (battery), bulb, wire, circuit, complete circuit / loop

Differentiation

- Support: give a photo or drawing of one working circuit to copy, then ask them to find a different working arrangement.
- Stretch: light two bulbs from one cell. Is each as bright as one bulb alone? (Sets up lesson 4.)

⚠ Safety

See the overview. Collect cells at the end of the lesson.

Teacher notes and misconceptions

- Common idea: "electricity only needs one wire, like a hose." The unclip test in step 3 challenges this directly.
- Strictly, a "battery" is two or more cells; everyday speech calls one AA a battery. Both words are fine at this age.
- If your kit uses LEDs, they light only one way round (current in one direction). Turn this into a question rather than calling it a fault.

Lesson 2: Conductors and insulators

Unit overview · Previous: Lesson 1 · Next: Lesson 3

Goal

Students predict, then test, which materials let electricity through, and record results in a table.

Materials (per group)

- Working circuit from lesson 1 with a third wire added so there is a gap between two crocodile clips (the "tester").
- Test objects: coin, plastic spoon, metal spoon, wooden lolly stick, rubber band, aluminium foil, paper, key, eraser, glass marble (10 objects).
- Results table: Object | Material | Prediction (lights / doesn't) | Result.

Steps

✎ Opening (5 min)

Show the tester. Touch the two free clips together: the bulb lights. Ask: "What if we put something in the gap?"

✎ Main activity (25 min)

1. Groups fill in the "Prediction" column for all 10 objects **before** testing. No changing predictions afterwards.
2. Test each object by clipping both clips onto it (or holding them firmly against it). Record the result.
3. Sort objects into two groups: "lets electricity through" (conductors) and "doesn't" (insulators).

✓ Discussion questions (with example answers)

- What do the conductors have in common? They are all metal (coin, metal spoon, foil, key).
- Were any of your predictions wrong? Which surprised you? Answers vary; common surprises: coins with dirty or painted surfaces, or foil with a plastic coating not conducting well.
- Why are wires covered in plastic? The metal inside carries electricity; the plastic is an insulator that stops it going where we don't want it, including into our hands.

✓ Closing check (5 min, with answers)

1. A new object: a paper clip. Conductor or insulator? **Conductor (metal).**

2. A plastic ruler? **Insulator.**
3. Name one material that is a conductor and one that is an insulator. **e.g. copper/steel/aluminium; plastic/wood/rubber/glass/paper.**

Vocabulary

conductor, insulator, material, prediction, result

Differentiation

- Support: give picture cards of the objects and a two-column sorting mat.
- Stretch: test a pencil lead (graphite) with the teacher (see note). Is it a metal? Does the "all conductors are metal" rule still hold?

⚠ Safety

Only test with the low-voltage tester. Explain that **water and human bodies can conduct** mains electricity, which is why we never test anything near wall sockets; we do not test wet objects or people in this lesson.

Teacher notes and misconceptions

- Graphite (pencil "lead") conducts but is not a metal. With one AA cell and a thin pencil lead the bulb may be very dim or not visibly lit; a short, thick piece works better. Use it as an "exceptions exist" moment, not a required result.
- Students sometimes think "shiny = conductor." A plastic object painted silver is a good counter-example if you have one.

Lesson 3: Switches

Unit overview · Previous: Lesson 2 · Next: Lesson 4

Goal

Students build a simple switch, explain it as "a gap we can open and close", and show it works anywhere in a single loop.

Materials (per group)

- 1 AA cell in a holder, 1 bulb, 1 buzzer, 4 crocodile-clip wires.
- Switch kit: a piece of card about 5 cm × 8 cm, 2 brass paper fasteners (split pins), 1 metal paper clip.

Steps

✎ Opening (5 min)

Ask: "How do you turn on a light at home without unplugging anything?" Link back to lesson 1: unclipping a wire turned the bulb off. A switch does the same job without unclipping.

✎ Main activity (25 min)

1. **Build the switch:** push both fasteners through the card about 3 cm apart. Hook the paper clip round one fastener so it can swing to touch the other. Open the fastener legs flat underneath.
2. Clip one wire to each fastener (underneath). Put the switch into the loop with the cell and bulb. Swing the paper clip: on, off.
3. **Does position matter?** Move the switch to a different place in the loop (before the bulb, after the bulb). Record: does it still control the bulb?
4. **Doorbell:** replace the bulb with the buzzer. The switch is now a doorbell button. If the buzzer is silent, try turning it round (many buzzers only work one way round, like LEDs).

✓ Discussion questions (with example answers)

- Explain how your switch works. When the paper clip touches both fasteners the loop is complete (metal conducts). When it is swung away there's a gap of air, which is an insulator, so the loop is broken.
- Did it matter where in the loop you put the switch? No. In a single loop, a break anywhere stops the whole loop.
- Why is the card a good base? Card is an insulator, so the electricity only goes through the paper clip, not across the card.

✓ Closing check (5 min, with answers)

1. In a switch, what is the "off" gap filled with? **Air (an insulator).**
2. Would a plastic paper clip work? **No, plastic is an insulator.**
3. A circuit has the switch between the cell and the buzzer. If we move the switch to the other side of the buzzer, will it still work? **Yes.**

Vocabulary

switch, open (off), closed (on), buzzer

Differentiation

- Support: pre-punch the holes in the card; pair with a confident builder.
- Stretch: design a "pressure switch" that turns on when something is stood on it (e.g. two foil strips separated by a sponge with a hole). Draw first, then build.

⚠ Safety

Brass fastener points are sharp; an adult can pre-punch holes with a sharp pencil. Same cell rules as lesson 1.

Teacher notes and misconceptions

- "Open" and "closed" are backwards from a door: an **open** switch is **off**. Say this explicitly; it confuses adults too.
- Some students think electricity is "used up" before the far side of the bulb, so the switch "after" the bulb shouldn't work. Step 3 tests this.

Lesson 4: A fair test: more bulbs

Unit overview · Previous: Lesson 3 · Next: Lesson 5

Goal

Students plan and carry out a fair test: does adding more bulbs to a single loop change how bright each bulb is?

Materials (per group)

- 1 AA cell in a holder, 3 identical bulbs in holders, 5 wires, a switch.
- Brightness scale card: 0 = off, 1 = dim glow, 2 = medium, 3 = bright.
- Planning sheet: question; what we change; what we keep the same; prediction; results table (Number of bulbs | Brightness, observer 1 | observer 2 | observer 3); conclusion.

Steps

✎ Opening (5 min)

Remind students of the grade 3 fair test: change **one** thing, keep the rest the same. Ask the question and have them write a prediction with a reason.

✎ Main activity (25 min)

1. **Plan:** fill in "What we change" (number of bulbs: 1, 2, 3) and "What we keep the same" (same cell, same type of bulb, same wires, same room light).
2. **Test:** build the loop with 1 bulb. Each group member rates brightness on the 0-3 scale **without telling the others**, then records. Repeat with 2 bulbs in the loop, then 3.
3. **Record and conclude:** "When we added more bulbs in one loop, each bulb got _____."

✓ Discussion questions (with example answers)

- What happened to brightness as you added bulbs? Each bulb got dimmer (typically 3 → 2 → 1, or 3 → 1 → 0 with a weak cell).
- Did all observers give the same number? Why not? Often not; judging brightness by eye is rough and depends on the observer. That's why we use more than one observer, and why scientists use meters (grade 10).
- What would have made the test unfair? Using a new cell for the 3-bulb test; using different types of bulb; moving to a sunnier spot.

✓ Closing check (5 min, with answers)

1. What did you change? **The number of bulbs.**

2. Name two things you kept the same. **Any two of: cell, bulb type, wires, room light, observers.**
3. Write one sentence conclusion. **"More bulbs in one loop made each bulb dimmer."** (Accept any conclusion that matches the group's own data.)

Vocabulary

fair test, variable, prediction, observer, conclusion, brightness

Differentiation

- Support: provide the planning sheet with "What we change" already filled.
- Stretch: try two cells with one bulb. Brighter or dimmer? (Only with bulbs rated for 3 V; check the rating with the teacher first.) Or try a **parallel** circuit: two bulbs each with their own loop to the cell. Compare brightness to the single loop.

⚠ Safety

Same as lesson 1. Do not add more cells than the bulbs are rated for: a bulb run above its rating can blow and get hot.

Teacher notes and misconceptions

- The explanation (each bulb adds resistance, so less current flows round the loop) is beyond grade 4. Accept "the cell has to push through more bulbs."
- If a group's data shows no change, check that bulbs are identical and the cell isn't flat; a flat cell gives 0 for everything.

Lesson 5: Drawing and designing circuits

Unit overview · Previous: Lesson 4

Goal

Students draw circuits with standard symbols, build a circuit from a drawing, and use what they know in a small design challenge. Ends with the unit check.

Materials (per group)

- Kit from lessons 1-4 (cell, bulbs, buzzer, wires, card switch).
- Symbol sheet (draw on the board): cell (long and short line), bulb (circle with a cross), switch (a line with a gap and a hinged line), buzzer, wire (straight lines with right-angled corners).
- Design brief cards (see below).

Steps

✎ Opening (10 min)

Show the symbols. Ask: "Why might engineers use symbols instead of drawing a realistic picture?" (Faster, clearer, anyone in the world can read them.) Draw lesson 1's circuit with symbols together.

✎ Main activity (20 min)

1. **Build from a drawing:** each group gets a symbol drawing (cell, switch, two bulbs in one loop) and builds it. Partner group checks.
2. **Design challenge** (choose one):
3. Lighthouse: a bulb at the top of a paper tower, with a switch at the bottom.
4. Door alarm: a buzzer that sounds when a door (a card flap) opens. Hint: the flap pushes two pieces of foil apart or together.
5. Quiz board: correct answers complete the loop and light the bulb.
6. Draw the design with symbols **before** building. Then build and test.

✓ Discussion questions (with example answers)

- Did your circuit work first time? What did you change? Answers vary; most common fixes are loose clips and a gap in the loop.
- Where is the switch in your design, and why there? e.g. "At the bottom of the lighthouse, so the keeper can reach it." (Any position works electrically; this is a design choice.)

✓ End-of-unit check (25 min, 8 questions, 16 marks)

1. Draw a circuit (symbols) with one cell, one bulb and one switch. **(3)**
2. A bulb doesn't light. Give two possible reasons. **(2)**
3. Sort into conductors and insulators: copper, rubber, aluminium, wood, steel, plastic. **(3)**
4. Why are electrical wires covered in plastic? **(2)**
5. What does a switch do in a circuit? **(1)**
6. In a fair test, why should you only change one thing? **(2)**
7. Amira adds a third bulb to a loop with two bulbs. Predict what happens to the brightness of each bulb. **(1)**
8. Why must you never experiment with wall sockets? **(2)**

Answer guide

1. Closed loop containing the cell symbol, a bulb symbol and a switch symbol, all connected: 1 mark per correct symbol in a complete loop.
2. Any two: a gap or loose clip; switch open; flat cell; broken bulb; an insulator in the loop; both wires on the same end of the cell.
3. Conductors: copper, aluminium, steel. Insulators: rubber, wood, plastic. Half a mark per correctly sorted material (6 × ½ = 3).
4. Plastic is an insulator (1); it stops electricity reaching us / going where it shouldn't (1).
5. It opens or closes a gap in the loop / turns the circuit on and off.
6. So you know which change caused the result (1); otherwise the result could be caused by something else (1).
7. Each bulb gets dimmer.
8. Mains electricity is much more powerful than a cell (1) and can seriously hurt or kill (1).

Vocabulary

symbol, circuit diagram, design, test, improve

Differentiation

- Support: give the symbol sheet during the check; read questions aloud.
- Stretch: draw a circuit where one switch controls two bulbs, and another where each bulb has its own switch (the second needs parallel loops).

⚠ Safety

Same as lesson 1. Foil in the door alarm must not join the two ends of the cell directly with nothing else in the loop (that's a short circuit).

Teacher notes and misconceptions

- Students often draw wires as wiggly lines; straight lines are a convention, not a rule of physics.

- Accept realistic pictures on question 1 for partial credit if the loop is correct; the symbols are the teaching point.

Grade 5 Science: Dissolving, Separating and Changes That Cannot Be Undone (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 4 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules.

Back to the science progression

Big idea

When some solids are stirred into water they dissolve: they seem to vanish, but they are still there, and the total mass stays the same. Mixtures can be separated by sieving, filtering, using a magnet or evaporating the water, and the right method depends on the materials. Dissolving, melting and evaporating can be undone. Burning, rusting and the fizz of bicarbonate of soda with vinegar make new materials, and cannot be undone.

Outcomes

By the end of the unit a student can:

1. Say which of several solids dissolve in water and which do not, using evidence (clear liquid with nothing settling, versus cloudy or settling).
2. Explain, using a weighing, that a dissolved solid is still there.
3. Plan and run a fair test of one thing that changes how fast sugar dissolves, changing one variable and keeping the others the same.
4. Choose and use a method (sieve, filter, magnet, evaporation) to separate a mixture, and explain why filtering cannot remove dissolved salt.
5. Sort changes into "can be undone" (reversible) and "makes a new material" (irreversible), and give at least two signs that a new material has formed.
6. Record results in a table and say how sure they are and why.

Prior knowledge

- Grade 2: solids and liquids; melting and freezing can be undone; some changes (cooking an egg) cannot.
- Grade 4: evaporation and the water cycle; reading a thermometer; fair tests with one changed variable.
- Reading a scale in grams and a timer in seconds.

Lessons

Lessons are 45-60 minutes. Set up the rusting jars (Lesson 4) at the end of Lesson 1, so they have about a week to change.

1. Where did it go? - dissolving tests with six solids, and weighing water before and after salt dissolves.

2. Faster dissolving - a fair test: stirring, warm water or smaller pieces.
3. Getting it back - sieving, filtering, magnets, and evaporating salty water to get the salt back.
4. New materials - bicarbonate of soda and vinegar, a candle burning (adult demonstration), and the rusting jars.
5. Mystery mixture - separate a four-part mixture, sort change cards, then the end-of-unit check.

Materials

For a class of about 30 in groups of 4-5:

- Clear plastic cups (about 200 ml), teaspoons, stirring sticks, trays, paper towels, cloths.
- Solids to test: table salt, granulated sugar, sugar cubes, dry sand, plain flour, small gravel or aquarium pebbles, chalk dust or crushed chalk (optional).
- Lesson 1: a kitchen scale reading to 1 g (one per group if possible, or one teacher scale at the front).
- Lesson 2: thermometers, a jug of warm tap water (an adult checks it is comfortable to touch), cold tap water, timers.
- Lesson 3: sieves or colanders, funnels, filter papers or coffee filters, plain steel paper clips (not iron filings), a strong but not tiny magnet per group, saucers or shallow dishes, a sunny sill or warm room.
- Lesson 4: bicarbonate of soda, white vinegar, a small plastic bottle and a balloon, safety goggles; for the teacher only: a candle in a stable holder, a lighter, a heatproof mat, and a fire blanket or whatever your school requires. Rusting jars: steel wool or plain (not galvanised or stainless) steel nails, three small jars or cups per group.
- Lesson 5: a bag of mystery mixture per group (see Lesson 5), change cards.

Assessment

- Lessons 1-4: listen to explanations during practical work; look at group results tables.
- Lesson 5: a 10-question end-of-unit check (20 marks) in Lesson 5. It is formative: use it to see what to revisit, not to grade students.

Sources

- Wikipedia, Solubility
- Wikipedia, Solution (chemistry)
- Wikipedia, Saturation (chemistry)
- Wikipedia, Suspension (chemistry)
- Wikipedia, Mixture
- Wikipedia, Conservation of mass
- Wikipedia, Sieve
- Wikipedia, Filtration
- Wikipedia, Magnetic separation
- Wikipedia, Evaporation
- Wikipedia, Crystallization
- Wikipedia, Physical change
- Wikipedia, Chemical change
- Wikipedia, Sodium bicarbonate
- Wikipedia, Vinegar

- Wikipedia, Combustion
- Wikipedia, Candle
- Wikipedia, Rust
- Wikipedia, Steel wool
- Wikipedia, Fire blanket

Known gaps and cautions

- Particles are left out on purpose. In the science progression the particle model comes in grades 6-8. Here, "the salt is still there" rests on evidence students can see: the mass stays the same, the water tastes salty (do not taste it in class), and evaporation brings the salt back.
- "Reversible" is simplified. Dissolving is undone by evaporating the water, but the salt comes back as crystals, not as the same grains. Some changes are hard to class (for example, cooking an egg is irreversible, but students may argue about melting chocolate that sets dull).
- Flour in water is a suspension, not a solution; chalk too. Students often call cloudy mixtures "dissolved". Lesson 1 uses "clear, with nothing settling after 5 minutes" as the working test.
- Results in Lesson 2 vary with room temperature and how hard students stir. Compare within one class on one day, and repeat if time allows.
- Burning is a teacher demonstration only. Check your school's fire and naked-flame rules before Lesson 4; leave the candle out if they do not allow it.
- No images yet. No educator review.

Lesson 1: Where did it go?

Back to the unit

Goal

Students test six solids in water and sort them into "dissolves" and "does not dissolve" using a clear rule. They weigh water before and after salt dissolves, and find that the mass does not change: the salt is still there.

Materials

Per group:

- Six clear cups, each with 150 ml of tap water (mark a line on the cups).
- Six labelled teaspoons of solid on paper or in small pots: salt, sugar, sand, plain flour, small gravel, crushed chalk (or swap chalk for coffee granules if you prefer a coloured example).
- Stirring sticks, a timer, a tray, paper towels.
- A results table (below).

For the weighing (one per group, or one teacher demonstration at the front):

- A kitchen scale reading to 1 g, a cup of 200 ml water, 10 g of salt measured out on paper.

For the rusting jars set up at the end (see Step 6): plain soap-free steel wool, three small jars or cups per group, salt, gloves.

Steps

✎ Opening (5 minutes)

Stir a spoon of sugar into a clear cup of water in front of the class until it disappears. Ask: "Where has the sugar gone? Is it still in the cup? How could we find out without tasting it?" Collect ideas on the board (look closely, weigh it, get it back somehow). Tell students we will try two of these today and the third in Lesson 3.

✎ Main activity (35-40 minutes)

1. **Predict.** Each group ticks "I think it will dissolve" or "I think it won't" for each solid before testing.
2. **Test.** Add one level teaspoon of each solid to its own cup. Stir for 1 minute (one student times), then leave it for 5 minutes without touching.
3. **Decide with a rule.** Write the class rule on the board: It has dissolved if the liquid is clear (it may be coloured) and nothing settles on the bottom after 5 minutes. Hold each cup up to the light.

Solid	Prediction	Clear after 5 min?	Anything settled?	Dissolved?
Salt				

Solid	Prediction	Clear after 5 min?	Anything settled?	Dissolved?
Sugar				
Sand				
Flour				
Gravel				
Chalk				

Expected results: salt and sugar dissolve (clear). Sand and gravel sink straight away. Flour and chalk make the water cloudy and slowly settle; by the rule they have not dissolved, even though they "spread out". 4. **Weigh it.** Put the cup of 200 ml water on the scale and write down the reading (for example 215 g, cup and water together). Put the paper of 10 g salt on the scale beside the cup and read the total (225 g). Tip the salt into the water, keep the empty paper on the scale, stir until no grains are left, and read again. It should still read 225 g, or within 1 g. Ask: "If the salt had really vanished, what would the scale say?" (About 215 g: the cup and water, plus the little the empty paper weighs.) 5. **Tidy.** Pour the salt and sugar water down the sink. Let sand, gravel and chalk settle, pour off the water, and put the solids in the bin (not the sink). 6. **Set up the rusting jars for Lesson 4.** Wearing gloves, each group puts a small ball of steel wool into three jars: **A** dry, with a lid on; **B** half-covered with tap water; **C** half-covered with salty water (one teaspoon of salt). Label them, add the date, and put them where they will not be knocked over. Each student draws what the steel wool looks like now.

✓ Discussion questions (with example answers)

- Flour made the water cloudy. Why don't we count it as dissolved? - You cannot see through it, and the flour slowly settles on the bottom. Salt water stays clear and nothing settles.
- How do we know the salt is still there? - The scale showed the same mass after the salt disappeared. (Also: salt water tastes salty, but we never taste things in science lessons.)
- Was our test fair? - Mostly: same amount of water, same spoon, same stirring time. It was less fair if some groups stirred harder or used heaped spoons.
- Coffee granules made brown water. Did they dissolve? - Yes, if it is clear brown with nothing settling. Clear does not mean colourless.

✓ Closing check (5 minutes, with answers)

1. Name one solid that dissolved in water. (Salt or sugar.)
2. Name one that did not. (Sand, gravel, flour or chalk.)
3. Water and cup weigh 215 g. You add 10 g of salt and it dissolves. What does the scale show now? (225 g.)
4. What is our rule for "dissolved"? (Clear, maybe coloured, and nothing settles after 5 minutes.)

Vocabulary

dissolve, solution, soluble, insoluble, mixture, settle, mass, gram

Differentiation

- **Support:** test three solids (salt, sand, flour) instead of six; give a results table with pictures; the teacher does the weighing at the front.
- **Stretch:** keep adding level teaspoons of salt to 150 ml of water, stirring 1 minute each time, until some salt stays on the bottom. Count the spoons. The water is now saturated. Does sugar take more or fewer spoons?

⚠ Safety

- Never taste or drink anything in the science lesson, even salt or sugar water. Use cups that are clearly not drinking cups if you can.
- Wipe spills straight away; wet floors are slippery.
- Chalk and flour dust: crush chalk inside a bag, not in the open air, and keep dust away from faces. Check for wheat or coeliac needs before using flour (gloves or a swap to cornflour).
- Salt or sand in the eyes: rinse with clean water and tell an adult. Wear goggles if your school requires them for practical work.
- Steel wool: wear gloves (it splinters into fingers), use soap-free steel wool, and keep it away from eyes.
- Do not pour sand, gravel or chalk down the sink.

Teacher notes and common misconceptions

- **"It melted."** Students often say sugar "melts" in water. Melting needs warming and happens to one material on its own (ice to water); dissolving needs a liquid to dissolve into. Gently correct every time.
- **"It disappeared, so it's gone."** The weighing is the evidence that it is still there. If a group's scale changes by 1-2 g, talk about spills, drips and how exact the scale is, rather than accepting "the salt lost weight".
- Hot water was not used today on purpose; temperature is the variable for Lesson 2.
- Keep one cup of salt water (labelled, covered) for Lesson 3.

Lesson 2: Faster dissolving

Back to the unit

Goal

Students plan and run a fair test of one thing that changes how fast sugar dissolves: stirring, water temperature, or piece size. They change one variable, keep the others the same, time the result, repeat it, and say how sure they are.

Materials

Per group:

- Four clear cups with a 150 ml line.
- Sugar cubes, and granulated sugar weighed out to match one cube (weigh a cube first; most are about 3-5 g).
- A thermometer, a timer (seconds), stirring sticks.
- Cold tap water, and warm tap water from a jug the adult has checked is comfortable to touch (about 35-40 °C; never from a kettle).
- A planning sheet and results table (below).

Steps

✎ Opening (5 minutes)

Show two cups: one sugar cube dropped into cold water, one into warm water and stirred. After a minute, ask: "Which dissolved faster? Can we say why?" Students should notice two things changed at once (warm and stirred), so we cannot tell which one mattered. That is today's problem.

✎ Main activity (35-45 minutes)

1. **Choose one variable.** Each group picks one question:
2. Does **stirring** make sugar dissolve faster?
3. Does **warmer water** make sugar dissolve faster?
4. Do **smaller pieces** (granulated sugar versus a cube of the same mass) dissolve faster?
5. **Plan.** On the sheet, groups write:
6. What we change: ...
7. What we keep the same: amount of water (150 ml), amount of sugar (one cube or its mass), and everything else except our variable.
8. What we measure: time in seconds until no sugar can be seen.
9. Prediction: "I think ... will dissolve faster because ..." The teacher checks each plan before groups start. Common gap: groups testing temperature forget to say "no stirring in either cup" (or "stir both the same way").
10. **Measure the temperature** of the water in each cup and write it down, even for groups not testing temperature.

11. **Run it.** Add the sugar to both cups at the same moment. Time until no grains or lumps are visible when the cup is held up to the light. **Stop at 5 minutes** and write "more than 300 s" if it has not finished.
12. **Repeat** with fresh water and sugar. If time allows, do a third run.

Run	Cup 1 (...) time in s	Cup 2 (...) time in s
1		
2		
3		

1. **Share.** Each group reports their question, result and how sure they are. Build one class summary.

Expected results: stirring, warmer water and smaller pieces each make sugar dissolve faster. An unstirred cube in cold water often takes far longer than 5 minutes. Exact times vary a lot between groups.

✓ Discussion questions (with example answers)

- Why did we stop at 5 minutes? - So the lesson fits in the time; "more than 300 s" is still a result. We know that cup was slower.
- Our two runs gave 40 s and 75 s for the same cup. Is that a mistake? - Not necessarily. Stirring speed, when we decided "no grains left" and the exact sugar amount vary. That is why we repeat and look for a pattern.
- Did warm water cause the change, or could it be something else? - If nothing else changed (same stirring, same sugar, same water amount), warm water is the best explanation.
- Why does a cube take longer than granulated sugar? - Only the outside of the cube touches the water at first. Small grains have much more surface touching the water.

✓ Closing check (5 minutes, with answers)

1. Sam tests warm versus cold water but stirs only the warm cup. What is wrong? (Two things changed, so Sam can't tell which made the difference.)
2. Name two things to keep the same in the stirring test. (Water amount, sugar amount, water temperature, type of sugar.)
3. Why do we repeat the test? (To check the result was not a one-off and to see how much the times vary.)

Vocabulary

variable, fair test, prediction, repeat, surface, temperature, degrees Celsius, seconds

Differentiation

- **Support:** give a part-filled plan with "what we change" already written for the stirring question; students fill in what stays the same and the times.

- **Stretch:** test three temperatures (cold, cool, warm) and draw a bar chart of the average time for each. Is the pattern a straight line?

⚠ Safety

- Warm tap water only, checked by an adult; no kettles or hot plates.
- Never taste the sugar water. Wipe spills straight away (sugar makes floors sticky and slippery).
- Thermometers: use spirit (red or blue liquid) or digital thermometers, not mercury. Lay them flat so they don't roll off the table.

Teacher notes and common misconceptions

- **"Hot water makes more sugar."** Some students think the sugar grows or multiplies. Weighing (Lesson 1) helps: the same mass goes in either way.
- **Faster is not the same as more.** Warm water also lets more sugar dissolve before it is saturated, but this lesson is only about speed. Keep the two questions separate.
- Deciding "no sugar left" is a judgement. Agree the rule before timing: hold the cup to the light, look at the bottom, no grains.
- Keep a cup of salty water from Lesson 1 (covered) for Lesson 3.

Lesson 3: Getting it back

Back to the unit

Goal

Students separate mixtures at four stations - sieve, filter, magnet and evaporation - and match each method to the materials it works for. They find that filtering cannot remove dissolved salt, but evaporating the water brings the salt back. So dissolving can be undone.

Materials

Set up four stations; groups rotate every 8-10 minutes.

- **Sieve station:** a mixture of dry sand and small gravel in a tub; a kitchen sieve; two empty tubs.
- **Filter station:** a cup of sandy water (stirred), a cup of salty water (from Lesson 1 or freshly made: one teaspoon of salt in 150 ml), funnels, filter papers or coffee filters, clear cups to catch the liquid.
- **Magnet station:** a tub of dry sand with about 20 plain steel paper clips mixed in; a magnet inside a small plastic bag (so clips drop off easily when the magnet is pulled out of the bag); a tray.
- **Evaporation station:** shallow dishes or saucers, salty water, labels, and a warm, sunny sill or a warm (not hot) spot near a radiator. A magnifying glass for looking at crystals later.
- A station sheet for each student (below).

Steps

✎ Opening (5 minutes)

Hold up a tub of sand with paper clips mixed in and a cup of salty water. Ask: "Could we get the paper clips back? Could we get the salt back? Would the same method work for both?" Students guess, then go and find out.

✎ Main activity (35-40 minutes)

At each station, students write the mixture, the method, what happened, and whether it worked.

Station	Mixture	Method	What happened	Worked?
1	sand + gravel	sieve		
2a	sand + water	filter		
2b	salt + water	filter		
3	sand + paper clips	magnet		

Station	Mixture	Method	What happened	Worked?
4	salt + water	evaporation		

1. **Sieve.** Shake the sand and gravel through the sieve over an empty tub. The gravel stays in the sieve because the pieces are bigger than the holes; sand falls through.
2. **Filter.** Fold a filter paper into a cone in the funnel and pour in the sandy water slowly. Sand stays on the paper; clearer water drips through. Now filter the salty water. The liquid that comes through still has the salt in it (it looks the same; we know it is salty, but do not taste it). The dissolved salt passes through the paper with the water.
3. **Magnet.** Sweep the bagged magnet slowly through the sand. Lift it over the tray and pull the magnet out of the bag: the paper clips drop. Count them. Did you find all 20?
4. **Evaporation.** Pour a little salty water into a shallow dish (about 1 cm deep), label it with names and date, and put it in the warm spot. This one takes days. Check it at the start of Lessons 4 and 5. When the water has gone, white salt crystals are left; look at them with a magnifying glass and draw them.

✓ Discussion questions (with example answers)

- Why didn't filtering get the salt out? - The salt is dissolved. It is spread through the water in pieces far too small to be caught by the paper, so it goes through with the water.
- Why did the sieve work for gravel but not for salt water? - Sieves and filters only catch pieces bigger than their holes. Gravel is big; dissolved salt is not.
- Where did the water go from the evaporation dish? - Into the air as water vapour (from grade 4: evaporation). Only the water leaves; the salt stays behind.
- Does this show dissolving can be undone? - Yes. We dissolved salt and then got salt back by evaporating the water. It comes back as crystals, not as the same grains, but it is still salt.

✓ Closing check (5 minutes, with answers)

1. Which method would you use to get iron nails out of sawdust? (A magnet.)
2. Which method would you use to get sand out of water? (Filter it.)
3. Can you filter sugar out of sugary water? Why? (No. The sugar is dissolved, so it goes through the filter with the water. Evaporate the water instead.)
4. Does a magnet pick up every metal? (No. Steel and iron, yes; aluminium, copper and brass, no. Coins vary from country to country.)

Vocabulary

mixture, separate, sieve, filter, filter paper, magnetic, evaporate, crystal, water vapour, residue

Differentiation

- **Support:** give the station sheet with the method already filled in, so students record only what happened and tick "worked" or "didn't work".

- **Stretch:** design a method to get both the salt and the sand out of a sand + salt + water mixture. (Filter to catch the sand, then evaporate the liquid to get the salt.) This is the start of Lesson 5's challenge.

⚠ Safety

- Use plain steel paper clips, not iron filings. Filings get into eyes and skin and are very hard to remove from magnets.
- Use a magnet that is too big to swallow. Keep small, strong (neodymium) magnets out of the classroom: two swallowed magnets can pinch the gut and need surgery.
- Keep magnets away from phones, cards and laptops.
- Evaporation dishes go somewhere warm, never on top of a radiator, heater or lamp. Do not heat salty water on a hob or burner in this lesson.
- Wipe spills; no tasting; sand stays out of the sink.

Teacher notes and common misconceptions

- **"Filtering makes water clean."** Filtered water can look clear but still have dissolved substances (and germs) in it. Never drink it.
- **"The salt evaporated."** Only the water evaporates; the salt is left behind. If students think the salt went into the air, ask why the dish is not empty.
- Evaporation is slow in a cold room. Start the dishes today so there are crystals by Lesson 5. If the room is cold, a warm spot near (not on) a radiator helps.
- "Magnetic" is for iron, steel, nickel and cobalt. Most other metals are not magnetic, which surprises many students.

Lesson 4: New materials

Back to the unit

Goal

Students see three changes that make new materials - bicarbonate of soda with vinegar, a candle burning (teacher demonstration) and steel wool rusting - and compare them with dissolving and melting. They list signs that a new material has formed and explain why these changes cannot be undone.

Materials

- **Fizz (per group):** a small plastic drinks bottle (about 500 ml), a balloon (check latex allergies; use a latex-free balloon if needed), a small funnel, 2 level teaspoons of bicarbonate of soda, about 100 ml of white vinegar, safety goggles for everyone in the group, a tray.
- **Candle (teacher only):** a candle in a stable holder on a heatproof mat, a lighter, a fire blanket or whatever your school requires, a cold metal spoon. Students stay behind a taped line at least 1 metre away.
- **Rusting jars** set up in Lesson 1 (A dry with a lid, B tap water, C salty water), gloves, a magnifying glass.
- The evaporation dishes from Lesson 3.
- A "Signs of a new material" chart (below).

Steps

✎ Opening (5 minutes)

Check the evaporation dishes from Lesson 3: is any salt showing yet? Remind students: dissolving and melting can be undone. Ask: "Can you think of a change you could never undo?" (Toast, a cooked egg, burnt paper, a rusty bike.) Today we look closely at three of these.

✎ Main activity (35-45 minutes)

1. **Fizz in a bottle (groups, 15 minutes).** Goggles on. Pour the vinegar into the bottle. Using the funnel, put 2 teaspoons of bicarbonate of soda into the balloon. Stretch the balloon neck over the bottle top, letting the balloon hang down so no powder falls in yet. Then lift the balloon so the powder drops into the vinegar. Watch and record: fizzing, the balloon filling up, the bottle feeling slightly cold. Ask: "What is inside the balloon?" A gas that was not there before - carbon dioxide. "Can we get the bicarbonate of soda back?" No: if you evaporate the liquid, you get a different white solid, not bicarbonate of soda.
2. **Candle (teacher demonstration, 10 minutes).** Students behind the line. Before lighting, show the candle and ask what it is made of (wax and a wick). Light it. Point out:

3. wax near the flame **melts** and runs down; when it cools it goes hard again (this part can be undone);
4. at the wick, wax is **burning**: there is light and heat, and the candle slowly gets shorter. That wax is not coming back;
5. hold a cold metal spoon briefly above the flame (not in it): it gets a black sooty mark, a new material. Blow out the candle and leave it to cool on the mat.
6. **Rusting jars (groups, 10 minutes).** Gloves on. Compare jars A, B and C with the drawings from Lesson 1. Usually: A (dry) shows little or no change; B (tap water) has orange-brown rust; C (salty water) usually has the most. Rub a little rust between gloved fingers: it is flaky and powdery, not shiny metal. Rust is a new material made from the iron in steel, water and oxygen from the air.
7. **Build the class chart.**

Sign that a new material has formed	Fizz	Candle	Rust
Gas given off (not from boiling)	yes	yes (smoke, invisible gases)	no
Colour change	no	yes (black soot)	yes (orange-brown)
Heat or light given out	no (it feels cold)	yes	no (very slow)
Cannot get the starting materials back	yes	yes	yes

Point out that the fizz felt cold: some new-material changes take in heat instead of giving it out. And no single sign is proof on its own - a fizzy drink gives off bubbles without a new material forming.

✓ Discussion questions (with example answers)

- Melting wax and burning wax both happened in the candle. What is the difference? - Melted wax goes hard again when it cools, so that can be undone. Burnt wax has turned into gases and soot, and does not come back.
- Why do you think jar C rusted most? - Salt water makes steel rust faster. (This is why cars and bridges near the sea or on salted roads rust more.)
- Why did jar A hardly change? - Steel needs water as well as air to rust. Jar A had no water added.
- Is dissolving like burning or like melting? - Like melting: we got the salt back by evaporating the water (Lesson 3).

✓ Closing check (5 minutes, with answers)

1. Name two signs that a new material may have formed. (Any two: gas given off, colour change, heat or light given out, can't get the starting materials back.)
2. Which can be undone: melting chocolate, burning paper, dissolving sugar, rusting a nail? (Melting chocolate and dissolving sugar.)
3. What gas filled the balloon? (Carbon dioxide.)

Vocabulary

reversible, irreversible, new material, burning, combustion, rust, gas, carbon dioxide, soot

Differentiation

- **Support:** give students the chart with pictures in the first column; they tick what they saw.
- **Stretch:** predict what would happen to the balloon with 4 teaspoons of bicarbonate of soda and the same vinegar, then test it if there is time. (Often a bigger balloon, until the vinegar is used up.)

⚠ Safety

- **Goggles** for everyone near the fizz bottles. Vinegar stings eyes: rinse with plenty of clean water and tell an adult.
- Point bottles away from faces; do not shake them or put a cap on them.
- **Balloons:** check latex allergies. Burst or loose balloons are a choking risk; collect them all at the end.
- **Candle: teacher only.** Check your school's naked-flame rules first; leave this part out if they don't allow it. Students stay behind the line; hair tied back, no loose sleeves near the flame; a fire blanket (or what your school requires) within reach; heatproof mat; never leave a lit candle; the spoon gets hot - put it on the mat to cool.
- **Steel wool:** gloves on; wash hands after. Pour rusty water away and wrap the steel wool before putting it in the bin.
- Never taste or smell chemicals up close. Waft gently with a hand if you need to smell vinegar.

Teacher notes and common misconceptions

- **"Melting and burning are the same."** Both happen in a candle, which is why it is a good demonstration. Keep coming back to "can it be undone?"
- **"The wax disappeared."** Burning wax turns into gases (mostly carbon dioxide and water vapour) and soot. It does not vanish; it becomes materials we mostly cannot see.
- **"Rust is a kind of dirt on the metal."** Rust is made from the iron in the steel. Rusty steel gets weaker because metal has been used up.
- The grade 6-8 particle model will later explain why new materials form; here it is enough to recognise and describe them.

Lesson 5: Mystery mixture

Back to the unit

Goal

Students plan and carry out a sequence of methods to separate a four-part mixture, sort change cards into "can be undone" and "makes a new material", and complete the end-of-unit check.

Materials

Per group:

- A "mystery mixture" in a clear tub: about 2 tablespoons each of dry sand, table salt and small gravel, plus 10 plain steel paper clips, all mixed together.
- A sieve, a magnet in a plastic bag, a funnel and filter paper, two clear cups, a shallow dish, about 200 ml of water, a stirring stick, a tray.
- A set of 12 change cards (below), cut out.
- The evaporation dishes from Lesson 3 (should now have salt crystals).
- The end-of-unit check, one per student.

Steps

✎ Opening (5 minutes)

Look at the Lesson 3 evaporation dishes with a magnifying glass. Ask: "We put salty water in. What is left? Where did the water go?" Then show the mystery mixture: "Four materials are hiding in here. Your job is to get each one out on its own. You have every tool from Lesson 3."

✎ Main activity (30-35 minutes, then the check)

1. **Plan the order (5 minutes).** Groups write numbered steps before touching the mixture. The teacher checks the plan. One order that works:
2. Magnet (in its bag) through the dry mixture to take out the paper clips.
3. Sieve to catch the gravel; sand and salt fall through.
4. Add water to the sand and salt and stir: the salt dissolves.
5. Filter: the sand stays on the paper.
6. Pour the salty liquid into a shallow dish and leave it somewhere warm to evaporate. The salt will be back in a few days. Groups may find other orders. If a group sieves first, the paper clips stay in the sieve with the gravel; they can still use the magnet then. If a group adds water first, the magnet and sieve still work but everything is wet and messy - a good thing to discuss.
7. **Carry it out (15 minutes).** Groups label each separated material. Leave the dish of salty water in the warm spot.
8. **Sort the change cards (10 minutes).** Two columns: Can be undone and Makes a new material (cannot be undone). Groups write one reason on any card they argue about.

Card	Answer
Ice melting	can be undone
Freezing juice into a lolly	can be undone
Dissolving sugar in tea	can be undone (evaporate the water)
A puddle drying up	can be undone, but arguable: the water is now vapour, and only comes back if it condenses
Candle wax melting	can be undone
Separating sand and gravel with a sieve	can be undone (mix them again)
Toasting bread	new material
Frying an egg	new material
A bike chain rusting	new material
Bicarbonate of soda fizzing in vinegar	new material
Wood burning on a bonfire	new material
Baking a cake	new material

✓ Discussion questions (with example answers)

- Why does the order of steps matter? - Some steps only work on dry mixtures (sieve, magnet), and the salt only separates from the sand once it is dissolved. Doing things in a sensible order saves mess.
- Which card was hardest to sort? Why? - Often "a puddle drying up": the water seems gone, but it is only water vapour, and it can turn back into liquid (grade 4: condensation).
- Was any change both? - Yes: in a candle, wax melting can be undone but wax burning cannot.

✓ Closing check: end-of-unit check (20-25 minutes)

Use it to see what to revisit, not to grade students. There is no pass mark. 10 questions, 2 marks each, 20 marks in total.

1. You stir a teaspoon of salt into one cup of water and a teaspoon of flour into another. Which one dissolves, and what would you see? (1 mark: salt. 1 mark: salt water is clear with nothing settling; flour water is cloudy and the flour slowly settles.)
2. A cup of water weighs 180 g. You add 15 g of sugar and stir until it dissolves. What does the scale read now? What does this tell you? (1 mark: 195 g. 1 mark: the sugar is still there even though you cannot see it.)
3. Mia tests whether a sugar cube or granulated sugar dissolves faster. She puts the cube in warm water and the granulated sugar in cold water. What is wrong, and how should she fix it? (1 mark: two things changed - piece size and temperature - so she can't tell which made the difference. 1 mark: use water at the same temperature in both cups.)
4. A group timed sugar dissolving. Stirred: 45 s and 52 s. Not stirred: 210 s and 240 s. What do the results show, and why did they do two runs? (1 mark: stirring makes sugar

dissolve faster. 1 mark: to check the result was not a one-off / to see how much the times vary.)

5. Which method would you use to (a) get sand out of water, (b) get iron nails out of sand? (1 mark each: (a) filter; (b) magnet.)
6. Can you get salt out of salty water by filtering? Explain. (1 mark: no. 1 mark: the salt is dissolved, so it goes through the filter paper with the water.)
7. How could you get the salt back from salty water, and where does the water go? (1 mark: leave it in a shallow dish somewhere warm so the water evaporates (or heat it, with an adult). 1 mark: the water goes into the air as water vapour; the salt stays behind.)
8. Sort these: melting butter, burning wood, dissolving salt, a rusting bike. (1 mark: melting butter and dissolving salt can be undone. 1 mark: burning wood and rusting make new materials.)
9. Give two signs that a new material may have formed. (1 mark each, any two: a gas given off (not from boiling); a colour change; heat or light given out; you cannot get the starting materials back.)
10. When a candle burns, give one change that can be undone and one that cannot. (1 mark: wax melting (it goes hard again when it cools). 1 mark: wax burning at the wick (it becomes gases and soot; the candle gets shorter).)

Vocabulary

Revise all unit words: dissolve, solution, insoluble, mixture, filter, sieve, magnetic, evaporate, crystal, reversible, irreversible, new material.

Differentiation

- **Support:** give the mystery-mixture plan as five cut-up step cards to put in order; read the check questions aloud; accept spoken answers.
- **Stretch:** add a fifth material to the mixture (for example a spoon of sugar). Can it be separated from the salt with these tools? (No: both dissolve, both pass through the filter and both are left behind when the water evaporates. Students should say so rather than invent a method.)

⚠ Safety

- Same as Lessons 1 and 3: no tasting; magnet too big to swallow and kept in its bag; plain paper clips, not filings; wipe spills; sand and gravel in the bin, not the sink.
- Evaporation dishes go near, never on, a heater. Do not heat salty water in class unless your school allows it and an adult does it.
- If students mention heating to speed up evaporation, discuss it, but keep it as an adult-only step.

Teacher notes and common misconceptions

- **Sorting cards are for talking, not just scoring.** Several cards are arguable (a puddle drying up is only undone if the water vapour condenses again somewhere). Reward clear reasons.

- **Question 8 split marks.** Give each mark only if both items in that group are right.
- Collect and check that every paper clip and magnet bag comes back.
- Keep the salt dishes: watching crystals appear over the next days links this unit to the grade 4 water cycle and grade 6-8 particle model.

Grade 6 Science — Fungi and decomposition

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (an AI agent) on 2026-11-04. No teacher has checked it yet. Read it fully, adapt it to your class and local rules, and test any practical work yourself before using it with students.

Back to all units

Big idea

Fungi are a separate kingdom of living things — not plants, not animals. Most of them feed by releasing digestive chemicals onto dead or living material and absorbing what dissolves. That habit makes them some of the world's main decomposers, returning nutrients to the soil, and it also explains why people use them (bread, medicine) and fear some of them (food spoilage, crop disease, poisonous mushrooms).

Outcomes

By the end of the unit, students can:

1. Give three ways fungi differ from plants (no photosynthesis; cell walls made of chitin, not cellulose; feed by absorbing food).
2. Name and recognise the three everyday forms of fungi: yeasts, moulds, mushrooms — and explain that a mushroom is only the reproductive part of a larger hidden network (mycelium).
3. Explain, using a simple diagram, how decomposers return nutrients from dead material to soil and then to plants.
4. Plan a fair test that changes one variable, keeps others the same, and records observations over several days.
5. Describe evidence that yeast is alive and produces a gas (carbon dioxide) when given sugar.
6. Give two ways fungi help people and two ways they harm people or crops.

Prior knowledge

- Living things need food and energy; plants make their own food using light.
- Basic idea of a food chain.
- Using a ruler and recording a table.

Lessons (about 50 minutes each)

#	Lesson	Practical?
1	What is a fungus?	Observation (shop mushrooms, hand lens)
2	Decomposers and the nutrient cycle	Leaf-litter observation
3	Mould on bread: a fair test	Set up sealed bags; observe for about 7 days
4	Yeast is alive: the balloon test	Yeast, sugar, warm water, balloons
5	Fungi and people + unit check	Discussion and written assessment

Lesson 3 needs follow-up of about 5 minutes on several later days to record the bags. You can run Lessons 4 and 5 during that week.

Materials (whole unit)

- Shop-bought mushrooms (e.g. button mushrooms), one per group; plastic knives; hand lenses; paper towels
- Trays or paper plates; a bag of leaf litter collected by the teacher from a garden or park (or a school compost heap)
- Bread without preservatives if possible (preservatives slow mould), water spray bottle, zip-seal plastic bags, sticky tape, permanent marker
- Dried baker's yeast (one 7 g sachet per group is plenty), sugar, warm (not hot) water about 35–40 °C, small plastic bottles (about 500 ml), balloons, funnel, measuring spoons, string or tape measure
- Student record sheets (tables are given in each lesson)

Assessment

- Ongoing: closing check questions at the end of each lesson (answers included).
- Lesson 3: the bread-mould record table and conclusion are a practical skills task.
- Lesson 5: a 10-question unit check with an answer guide and simple marking notes.

Sources

These are general references that a teacher can use to check facts. Links were checked to load on 2026-11-04.

- Wikipedia, "Fungus": https://en.wikipedia.org/wiki/Fungus
- Wikipedia, "Hypha": https://en.wikipedia.org/wiki/Hypha
- Wikipedia, "Mycelium": https://en.wikipedia.org/wiki/Mycelium
- Wikipedia, "Chitin": https://en.wikipedia.org/wiki/Chitin
- Wikipedia, "Decomposer": https://en.wikipedia.org/wiki/Decomposer
- Wikipedia, "Nutrient cycle": https://en.wikipedia.org/wiki/Nutrient_cycle
- Wikipedia, "Saccharomyces cerevisiae" (baker's yeast): https://en.wikipedia.org/wiki/Saccharomyces_cerevisiae
- Wikipedia, "Cellular respiration": https://en.wikipedia.org/wiki/Cellular_respiration
- Wikipedia, "Penicillin": https://en.wikipedia.org/wiki/Penicillin
- Wikipedia, "Alexander Fleming": https://en.wikipedia.org/wiki/Alexander_Fleming
- Wikipedia, "Mycorrhiza": https://en.wikipedia.org/wiki/Mycorrhiza
- Wikipedia, "Mushroom poisoning": https://en.wikipedia.org/wiki/Mushroom_poisoning
- Wikipedia, "Amanita phalloides" (death cap): https://en.wikipedia.org/wiki/Amanita_phalloides

A teacher should prefer their national curriculum documents and school science-safety guidance where these exist.

Known gaps and cautions

- **Simplifications (labelled for teachers):** "Fungi absorb their food" is true of nearly all fungi but hides variety. The yeast balloon test is mostly fermentation (respiration without much oxygen), which makes carbon dioxide and a little alcohol; at grade 6 we call it

"respiration" and mention the distinction only in teacher notes. "Kingdom" is used as a simple grouping; modern classification is more complicated.

- **Safety:** mould spores can trigger allergies and asthma. The bread bags stay sealed for the whole experiment and are thrown away sealed. Students never pick or taste wild mushrooms or fungi — some deadly species look like edible ones. An adult prepares the warm water. Check for yeast, wheat/gluten and mushroom allergies before practical lessons.
- Not aligned to any official standard yet. Times are estimates.
- No images are included; teachers will want photos or real specimens of mushrooms, bracket fungi and mould.

Lesson 1: What is a fungus?

Time: 50 minutes

Unit overview · Next: Lesson 2

Goal

Students can give three ways fungi differ from plants and name the three everyday forms of fungi (outcomes 1 and 2).

Materials

- One shop-bought button mushroom per group of 3–4, on a paper towel; plastic knife; hand lens
- Board or slide with three pictures: a loaf of bread rising (yeast), a mouldy orange (mould), a toadstool in a forest (mushroom)
- Optional: a slice of old mouldy bread sealed inside a clear zip bag and taped shut, for looking at only

Steps

1. **Opening (5 min).** Hold up a mushroom. Ask: "Is this a plant? Vote with your hands." Write the vote on the board and say we will vote again at the end.

2. **Main activity (30 min).**

3. Look closely (12 min). Groups cut their mushroom from top to bottom and use the hand lens. They draw it and label: **cap**, **stem (stalk)**, **gills** under the cap. Ask them to look for anything green (there is none) and for roots (there are none — any white threads at the base are hyphae).
4. Teacher explains (8 min). Fungi are their own kingdom of life. Key points, written on the board:
    - Fungi have **no chlorophyll**, so they cannot make food from light.
    - They **feed by absorbing**: they release digestive chemicals (enzymes) onto food outside their body, then soak up the dissolved food.
    - Their bodies are made of tiny threads called **hyphae**. A big tangled network of hyphae is a **mycelium**, usually hidden in soil, wood or food.
    - Their cell walls are made of **chitin** — the same tough material found in insect shells — not cellulose like plants.
    - A mushroom is only the **fruiting body**: the part that makes and releases **spores** (like seeds, but a single cell). Most of the fungus is the mycelium underground.

5. Three forms (10 min). Show the three pictures. Students copy and complete this table:

Form	What it looks like	Example
Yeast	Single cells, too small to see one alone	Baker's yeast that makes bread rise
Mould	Fuzzy threads on food	Green-blue mould on old bread or oranges

Form	What it looks like	Example
Mushroom	Fruiting body above ground	Button mushroom, toadstool, bracket fungus on a tree

6. **Discussion questions (10 min).**
7. "Why can a mushroom grow in a dark cupboard but a bean plant can't?" — Example answer: the mushroom doesn't use light to make food; it absorbs food from what it grows on. The bean plant needs light for photosynthesis.
8. "If you pick a mushroom, have you killed the fungus?" — Example answer: usually not; the mycelium underground is still alive, like picking an apple doesn't kill the tree.
9. "Why do you think fungi grow on dead logs and old food?" — Example answer: that is their food; they digest it and absorb it.
10. **Closing check (5 min).** Vote again: plant or not? Then:
11. Q1. Give two differences between fungi and plants. — Any two: no chlorophyll/can't photosynthesise; absorb food; chitin walls (not cellulose); made of hyphae; reproduce by spores (plants also can, e.g. ferns, so accept this only alongside another difference).
12. Q2. What is the name of the network of threads that makes up most of a fungus? — Mycelium (threads = hyphae).

Vocabulary

- fungus (plural fungi): a living thing that is not a plant or animal and feeds by absorbing food
- hypha (plural hyphae): one tiny thread of a fungus
- mycelium: the network of hyphae that makes up most of a fungus
- spore: a tiny cell a fungus releases to make a new fungus
- chitin: a tough material in fungus cell walls (also in insect shells)
- fruiting body: the part that makes spores, e.g. a mushroom

Differentiation

- Extra support: give a pre-drawn mushroom outline to label; give the table with the "Example" column filled in.
- Extra challenge: fungi are more closely related to animals than to plants. Ask students to list ways a fungus is like an animal (doesn't photosynthesise, eats other things, has chitin like insects) and ways it is not (doesn't move, has cell walls).

⚠ Safety

- Use shop-bought mushrooms only. No one eats anything in this lesson. Wash hands afterwards.
- Never pick or taste wild mushrooms. Some deadly species (such as the death cap) look similar to edible ones, and even experts use careful identification.
- The mouldy-bread bag, if used, stays sealed and is thrown away sealed.
- Ask about mushroom allergies beforehand.

Teacher notes

- Misconception: "Mushrooms are plants because they grow in the ground and don't move." Answer: so do many things; what matters is how they get food and what they are made of.
- Misconception: "Mould is dirt." Answer: mould is a living fungus growing on the food.
- Misconception: "Spores are seeds." Answer: similar job, but a spore is a single cell with no stored food and no baby plant inside.
- Simplification: "kingdom" is a useful grouping for this age; modern biology classifies living things by relatedness in a more complicated tree.

Lesson 2: Decomposers and the nutrient cycle

Time: 50 minutes

Unit overview · Previous: Lesson 1 · Next: Lesson 3

Goal

Students can explain, with a diagram, how decomposers return nutrients from dead material to the soil and to plants (outcome 3).

Materials

- A bag of leaf litter collected by the teacher (top layer of fallen leaves and the darker, crumbly layer underneath), from a garden, park or compost heap
- Trays or paper plates, plastic spoons, hand lenses, disposable gloves
- Sorting sheet with three columns: "Fresh leaves", "Partly broken down", "Crumbly soil-like"

Steps

1. **Opening (5 min).** Ask: "Every autumn, trees drop millions of leaves. Why aren't forests buried metres deep in old leaves?" Collect ideas without correcting yet.

2. **Main activity (30 min).**

3. Leaf-litter sort (15 min). Each group gets a spoonful-sized pile of litter on a tray. Wearing gloves, they sort pieces into the three columns. With the hand lens, they look for: white or yellow threads (fungal hyphae), small animals (woodlice, worms, mites), holes and skeleton-like leaves where only the veins remain. They record what they find in words and sketches.
4. Teacher explains (10 min). Draw the cycle on the board as a loop:
    1. A plant takes **nutrients** (such as nitrogen and phosphorus) from the soil and grows.
    2. The plant (or an animal that ate it) dies, or drops leaves.
    3. **Decomposers** — mainly fungi and bacteria — digest the dead material. Small animals like worms and woodlice help by breaking it into smaller pieces (they are often called detritivores).
    4. Digestion releases the nutrients back into the soil.
    5. New plants take them up. The loop starts again. Explain that fungi are especially good at breaking down tough wood and leaves, which many other living things cannot digest.

5. Students draw (5 min). Each student draws the cycle with at least five labelled arrows.

6. **Discussion questions (10 min).**

7. "Back to the opening question: why aren't forests buried in leaves?" — Example answer: fungi, bacteria and small animals break the leaves down into soil every year.
8. "What would happen to a forest if all the decomposers disappeared?" — Example answer: dead material would pile up; nutrients would stay locked inside it; the soil would run out of nutrients and new plants would struggle to grow.

9. "Which column had the most fungal threads, and why?" — Example answer: usually the partly broken down layer, because fungi are actively digesting it there. (Accept any answer backed by what the group saw.)

10. **Closing check (5 min).**

11. Q1. What is a decomposer? — A living thing that breaks down dead material and returns nutrients to the soil (e.g. fungi, bacteria).
12. Q2. Put in order: plant grows / leaf falls / fungi digest leaf / nutrients in soil. — Plant grows → leaf falls → fungi digest leaf → nutrients in soil → (plant grows again).

Vocabulary

- decomposer: a living thing that breaks down dead material, e.g. fungi and bacteria
- detritivore: a small animal that eats dead material, e.g. worm, woodlouse
- nutrient: a substance living things need to grow, e.g. nitrogen
- leaf litter: the layer of fallen leaves and bits on the ground

Differentiation

- Extra support: provide the cycle diagram with blank labels and a word bank.
- Extra challenge: add the Sun and photosynthesis to the diagram, showing that energy flows through (and leaves as heat) while nutrients go round in a cycle.

⚠ Safety

- Teacher collects the litter beforehand from a place without dog waste, broken glass or sprayed chemicals.
- Gloves on; no hands near faces; wash hands afterwards. Return small animals outside after the lesson.
- Students with asthma or mould allergy should be told in advance; keep the room ventilated and don't shake the litter.

Teacher notes

- Misconception: "Things rot because they get old." Answer: rotting is done by living decomposers. Without them (e.g. in very cold, dry or airless places) things last a very long time.
- Misconception: "Decomposers are bad/dirty." Answer: without them, ecosystems would stop working.
- Misconception: "Plants eat soil." Answer: plants take small amounts of dissolved nutrients and water from soil; most of their body mass comes from carbon dioxide in the air, via photosynthesis.
- Simplification: we show one tidy loop; real nutrient cycles have many branches.

Lesson 3: Mould on bread — a fair test

Time: 50 minutes to set up, then about 5 minutes on 4–5 later days to observe

Unit overview · Previous: Lesson 2 · Next: Lesson 4

Goal

Students plan and run a fair test that changes one variable, keeps others the same, and records observations over several days (outcome 4).

Materials (per group)

- 2 slices of the same bread, from the same loaf (bread without preservatives grows mould faster; note the type used)
- 2 zip-seal plastic bags, clear sticky tape, permanent marker
- Water spray bottle (or a teaspoon of water)
- A ruler or a clear grid sheet with 1 cm squares to lay over the bag
- Record sheet (table below)
- Shared places with different conditions: a warm spot (e.g. on a shelf in the classroom) and a cold spot (a fridge with no food in it, or bags inside a second sealed container - see Safety)

Steps

1. **Opening (5 min).** Ask: "Why do we keep bread in a bag, and why does it go mouldy faster in summer?" Collect ideas. Tell students that mould grows from spores already floating in the air and sitting on the bread — we don't need to add any.

2. **Main activity (30 min).**

3. Choose one question (8 min). Each group chooses ONE of these to test:
    - A. Does moisture affect how fast mould grows? (dry slice vs. slice sprayed with 5 sprays of water)
    - B. Does temperature affect how fast mould grows? (warm shelf vs. fridge; both slices sprayed the same)
4. Plan a fair test (10 min). Students fill in:
    - The one thing we change (independent variable): _____
    - What we measure (dependent variable): how much of the slice is covered with mould
    - Things we keep the same (control variables): at least three, e.g. same bread, same size slice, same type of bag, same amount of water (in B), same light, same days
    - Prediction: "I think ____ will grow mould faster because ____."

5. Set up (12 min). Spray/prepare slices as planned. Place each slice in its own bag, squeeze out most air, seal the zip and **tape it shut**. Label each bag with group name, condition and date. Put bags in their places. **Bags are never opened again.**

6. **Discussion questions (10 min).**

7. "Why do we test only one thing at a time?" — Example answer: if we change two things and one slice gets mouldier, we can't tell which change caused it.

8. "Why do we use bread from the same loaf?" — Example answer: different breads have different ingredients and preservatives, which could change the result; keeping it the same keeps the test fair.

9. "How could we make our result more trustworthy?" — Example answer: repeat with more slices for each condition and compare; other groups doing the same test also helps.

10. **Closing check (5 min).**

11. Q1. In test B, what is the independent variable? — Temperature (warm vs. cold).
12. Q2. Name two control variables. — Any two: same bread/loaf, same slice size, same water, same bag type, same light, same time.

Observation days (about 5 minutes each, e.g. days 2, 3, 5, 7)

Without opening the bags, students lay the 1 cm grid over each bag and count squares that are at least half covered by mould. They also note colours (white, green, blue-green, black) and smell is **not** tested.

Day	Condition 1: squares with mould	Colours seen	Condition 2: squares with mould	Colours seen
0	0	—	0	—
2				
3				
5				
7				

Conclusion (final observation day, 15 min)

Students draw a simple line graph (day on the bottom axis, squares with mould on the side axis, one line per condition) and write:

- "The ____ slice grew mould faster. This supports / does not support my prediction."
- "One reason this might happen is ____."
- "One way our test might not have been fair is ____."

Expected results (for the teacher): moist, warm bread usually grows visible mould within about 3–7 days; dry bread and bread in a fridge grow it much more slowly. Results vary a lot with bread type and room temperature, and no-growth results are still valid data — use them to discuss.

Vocabulary

- variable: anything that can change in an experiment
- independent variable: the one thing we choose to change
- dependent variable: what we measure
- control variables: things we keep the same to make the test fair
- prediction: what we think will happen and why

Differentiation

- Extra support: give the plan with the control variables partly filled in; let students count squares with a partner.
- Extra challenge: test three levels (dry / 3 sprays / 6 sprays) or add a third location (dark cupboard) and explain whether light matters.

⚠ Safety

- **Bags stay sealed and taped for the whole experiment and are thrown away sealed** in the general rubbish (put inside a second bag). Mould spores can trigger allergies and asthma; opening the bags releases them.
- Students with mould allergy or asthma record data from photos of the bags (taken by the teacher or a classmate) instead of handling or sitting near the bags.
- Don't put bags with mould in a fridge that holds food unless it is a dedicated fridge or the bags are inside a second sealed container; check your school's rules.
- Wash hands after handling the bags.

Teacher notes

- Misconception: "The mould came from inside the bread / was created by the water." Answer: spores were already on the bread and in the air; water and warmth let them grow.
- Misconception: "Just scrape off the mould and the rest is fine." Answer: hyphae grow through the food, beyond what you can see; general advice is to throw mouldy bread away.
- Many groups will forget that a fridge is also dark. Use this to discuss a hidden second variable — a great learning moment.
- Simplification: counting covered squares is a rough measure; that's fine for this age and worth discussing as a limitation.

Lesson 4: Yeast is alive — the balloon test

Time: 50 minutes

Unit overview · Previous: Lesson 3 · Next: Lesson 5

Goal

Students describe evidence that yeast is alive and produces a gas (carbon dioxide) when it has sugar (outcome 5).

Materials (per group)

- 2 small clean plastic bottles (about 500 ml), labelled A and B
- 2 balloons (stretch them a few times first so they inflate easily)
- 1 sachet (7 g) dried baker's yeast, split into two equal halves
- 2 teaspoons of sugar
- Warm water at about 35–40 °C (comfortably warm to touch, not hot) — **prepared by an adult**
- Funnel, measuring jug, teaspoon, string and ruler (or tape measure)
- Optional for the class demo: a slice of bread to show the holes made by gas

Steps

1. **Opening (5 min).** Show a slice of bread and ask: "Where do the holes in bread come from?" Then show the dry yeast: "This is a fungus. Is it alive? How could we find out?"

2. **Main activity (30 min).**

3. Set up (10 min). In both bottles, use the funnel to put half the yeast and 100 ml warm water. In bottle A **only**, add 2 teaspoons of sugar. Swirl gently. Stretch a balloon over each bottle's neck. Bottle B (no sugar) is the **control**.
4. Predict (3 min). Students write which balloon will inflate more and why.

5. Observe (15 min). Every 5 minutes, measure around the widest part of each balloon with string and ruler, and note bubbles or foam in the bottle. Record in a table:

Time (min)	A (sugar): balloon size (cm)	A: bubbles?	B (no sugar): balloon size (cm)	B: bubbles?
0				
5				
10				
15				

6. Teacher explains (2 min). Yeast cells use sugar as food to release energy. One waste product is a gas, **carbon dioxide**, which fills the balloon. In bread dough, the same gas makes bubbles that become the holes. Using food to release energy is something all living things do.

Expected result (for the teacher): bottle A foams and its balloon usually starts to inflate within 10–20 minutes; bottle B changes little. If the room is cold or the water was too hot, results may be slow — keep the bottles somewhere warm and check again at the end of the lesson.

1. **Discussion questions (10 min).**
2. "What is the evidence that yeast is alive?" — Example answer: it used food (sugar) and produced a gas; dead things don't do that. With no sugar, little happened.
3. "Why did we have bottle B?" — Example answer: to show that the sugar made the difference, not just the water or the yeast on its own.
4. "What might happen if we used boiling water?" — Example answer: it would kill the yeast, so no gas would be made. (Teacher can demonstrate this safely as an extension.)
5. **Closing check (5 min).**
6. Q1. What gas filled the balloon? — Carbon dioxide.
7. Q2. What does yeast use as food in this test? — Sugar.
8. Q3. How does this explain the holes in bread? — Yeast in the dough makes carbon dioxide bubbles, which get trapped and leave holes when the bread is baked.

Vocabulary

- yeast: a fungus made of single cells, used in baking
- carbon dioxide: a gas made when living things use food for energy
- control: the part of an experiment where we leave out the thing being tested, so we can compare
- respiration: the process of using food to release energy (not the same as breathing)

Differentiation

- Extra support: pre-labelled bottles; a results table with time already filled in; sentence starters ("Balloon A got bigger because…").
- Extra challenge: plan a follow-up test: does the amount of sugar, or the water temperature, change how fast the balloon inflates? Identify the variables.

⚠ Safety

- An adult prepares and pours the warm water; it must not be hot enough to scald (aim for 35–40 °C).
- Check for yeast allergy. Nothing is tasted. Bottles can be emptied down a sink with running water afterwards; wash hands.
- Balloons: check for latex allergy and use latex-free balloons if needed.
- Bottles must have the balloon only on top — never seal a bottle with a cap during this experiment, because gas pressure builds up.

Teacher notes

- Misconception: "Respiration means breathing." Answer: breathing moves air in and out of lungs; respiration is the chemical process in cells that releases energy from food. Yeast respires but has no lungs.

- Misconception: "The sugar fizzed like a fizzy drink." Answer: sugar in water without yeast doesn't produce gas — add a third bottle with sugar and water only, no yeast, if students raise this.
- Simplification: in a balloon-sealed bottle, yeast mostly carries out **fermentation** (respiration with little oxygen), which makes carbon dioxide and a small amount of alcohol. At this level calling it respiration is fine; older students can learn the difference.

Lesson 5: Fungi and people + unit check

Time: 50 minutes (25 min lesson, 25 min unit check)

Unit overview · Previous: Lesson 4

Goal

Students give two ways fungi help people and two ways they harm people or crops (outcome 6), then show what they have learned across the unit.

Materials

- Six "fungus fact cards" (text below), printed, one set per group
- A large two-column sheet per group: "Helpful" / "Harmful"
- Unit check, one copy per student

Steps

1. **Opening (3 min).** Ask: "Are fungi our friends or our enemies?" Quick show of hands.
2. **Main activity (15 min).** Groups read the six cards and sort them into Helpful / Harmful (some can go in both). Then each group writes one sentence per card on why.
3. **Card 1 — Bread and food.** Baker's yeast makes bread rise. Fungi are also used to make soy sauce, some cheeses (the blue veins in blue cheese are a mould) and other foods.
4. **Card 2 — Penicillin.** In 1928, the scientist Alexander Fleming noticed that a mould growing on one of his dishes had stopped bacteria growing around it. The substance it made, penicillin, became one of the first antibiotics — medicines that kill bacteria — and has saved a very large number of lives.
5. **Card 3 — Mycorrhizae (my-co-RYE-zee).** The hyphae of many fungi join with plant roots. The fungus helps the plant take up water and nutrients such as phosphorus; the plant gives the fungus sugars it made by photosynthesis. Most land plants have partnerships like this.
6. **Card 4 — Crop and tree diseases.** Some fungi attack living plants. Rusts and mildews damage crops such as wheat; fungal diseases have killed huge numbers of trees in some countries.
7. **Card 5 — Food spoilage.** Moulds grow on bread, fruit and other food, making it unsafe or unpleasant to eat. Some moulds produce poisons.
8. **Card 6 — Poisonous mushrooms.** A few wild mushrooms are deadly. The death cap can look like edible mushrooms and causes many of the world's deaths from mushroom poisoning. This is why nobody should eat a wild mushroom unless an expert has identified it — and even then, many people simply don't.
9. **Discussion questions (5 min).**
10. "Which card surprised you most?" — Any answer with a reason.

11. "Is one fungus 'good' or 'bad'?" — Example answer: it depends on where it is. Mould on bread is a problem in the kitchen, but the same kind of fungus breaking down fallen leaves in a forest is useful.

12. **Closing check (2 min).**

13. Q1. Name one medicine that came from a fungus. — Penicillin.
14. Q2. How does a mycorrhizal fungus help a plant? — It helps the plant take up water and nutrients (and gets sugar in return).

✓ Unit check (25 min)

1. Give **two** ways a fungus is different from a plant. (2 marks)
2. What is a mycelium? (1 mark)
3. A mushroom is the _____ body of a fungus; it releases _____. (2 marks)
4. Name the three everyday forms of fungi and give one example of each. (3 marks)
5. Explain what decomposers do and why forests need them. (2 marks)
6. Draw a nutrient cycle with at least four labelled stages, including decomposers. (3 marks)
7. Ali tests whether bread goes mouldy faster in a warm place or in a fridge. He puts white bread in the warm place and brown bread in the fridge. Is this a fair test? Explain. (2 marks)
8. In the balloon test, bottle A (yeast, sugar, warm water) blew up its balloon and bottle B (yeast, warm water, no sugar) did not. What does this show? (2 marks)
9. Give one way fungi help people and one way fungi harm people or crops. (2 marks)
10. Your friend finds a mushroom in the park that looks like the ones in the shop and wants to cook it. What would you say, and why? (1 mark)

Total: 20 marks.

Answer guide

1. Any two of: cannot photosynthesise / no chlorophyll; feed by absorbing food (digest outside the body); cell walls made of chitin, not cellulose; body made of hyphae. (1 each)
2. A network of fungal threads (hyphae), usually hidden in soil, wood or food. (1)
3. Fruiting (1); spores (1).
4. Yeast — e.g. baker's yeast; mould — e.g. mould on bread/oranges; mushroom — e.g. button mushroom, toadstool, bracket fungus. (1 per correct form with example)
5. They break down dead material (1) and return nutrients to the soil so new plants can grow; without them dead material would pile up and soil would lose nutrients (1).
6. Award up to 3: plant grows using nutrients from soil; plant/leaf dies or falls; decomposers (fungi/bacteria) break it down; nutrients return to soil. Arrows must form a loop for full marks.
7. No (1). He changed two things — temperature and type of bread — so he can't tell which caused any difference; he should use the same bread in both places (1).
8. Yeast needs sugar (food) to produce gas (1); the gas (carbon dioxide) is evidence yeast is alive / respiring (1).
9. Help: e.g. bread, penicillin, decomposition, mycorrhizae (1). Harm: e.g. food spoilage, crop/tree disease, poisonous mushrooms, allergies (1).
10. Don't eat it — some poisonous mushrooms look like edible ones and can be deadly; only experts can identify them safely (1).

Marking notes: accept clear answers in the student's own words. For question 6, a clear drawing with labels is better than a neat one.

Vocabulary

- antibiotic: a medicine that kills bacteria
- mycorrhiza (plural mycorrhizae): a partnership between a fungus and plant roots
- spoilage: food going bad
- poisonous: can harm or kill if eaten

Differentiation

- Extra support: read the cards aloud; allow the unit check to be answered orally or with a word bank (hyphae, spores, fruiting, decomposer, carbon dioxide, sugar, chitin).
- Extra challenge: research one more fungus (e.g. the fungus used to make a meat substitute, or a fungus that grows on insects) and add a seventh card.

⚠ Safety

- No specimens handled in this lesson. Repeat the rule: never pick or taste wild mushrooms.

Teacher notes

- Misconception: "Antibiotics kill viruses." Answer: they act on bacteria, not viruses such as colds and flu.
- Misconception: "Fleming invented penicillin." Answer: he discovered the mould's effect; other scientists (notably Howard Florey and Ernst Chain's team) later found how to purify and produce it as a medicine.
- Simplification: "Most land plants have mycorrhizal partnerships" is accurate as a general statement; exact percentages vary by source and group of plants.

Grade 7 Science — Photosynthesis and respiration: where a plant's mass comes from

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (an AI agent) on 2026-11-04. No teacher has checked it yet. Read it fully, adapt it to your class and local rules, and test any practical work yourself before using it with students.

Back to all units

Big idea

A tree is mostly made from air. Green plants take in carbon dioxide and water and, using light energy captured by chlorophyll, make sugar (glucose) and release oxygen. This is photosynthesis. All living things, plants included, break down sugar with oxygen to release the energy they need, giving off carbon dioxide and water. This is respiration. It happens day and night. The two processes run in opposite directions, and together they move carbon between the air and living things.

Outcomes

By the end of the unit, students can:

1. Write the word equations for photosynthesis (carbon dioxide + water → glucose + oxygen, needing light and chlorophyll) and for aerobic respiration (glucose + oxygen → carbon dioxide + water, releasing energy).
2. Explain, using van Helmont's willow experiment and the photosynthesis equation, why most of a plant's mass does not come from the soil.
3. Use the iodine test to show starch is present, and explain that plants store some of the glucose they make as starch.
4. Plan and carry out a fair test of how light intensity affects the rate of photosynthesis, using floating leaf discs, and draw a line graph of the results.
5. Use an indicator (bromothymol blue) to show carbon dioxide being taken in or given out, and explain why a plant in the dark adds carbon dioxide to the water.
6. Correct the common ideas that "plants respire only at night", "respiration is breathing" and "plants get their food from the soil".

Prior knowledge

- Plants need light and water to grow well (grade 1); living things need food for energy.
- Fungi and other decomposers release carbon dioxide as they break down dead material (grade 6).
- Fair tests: change one thing, keep the rest the same, repeat (grades 3–6).
- Reading and drawing simple tables and line graphs.

Lessons (about 50 minutes each)

#	Lesson	Practical?
1	Where does a tree come from?	Iodine starch test on foods

#	Lesson	Practical?
2	Leaves make oxygen: floating leaf discs	Leaf discs in light and in the dark
3	More light, faster photosynthesis? A fair test	Lamp at three distances; graph
4	Respiration never stops: the indicator tubes	Bromothymol blue tubes, light and dark
5	Two processes, one carbon cycle + unit check	Discussion and written assessment

Lesson 4 needs a short look at the tubes the next day (about 5 minutes).

Materials (whole unit)

- Lesson 1: dilute iodine solution in dropper bottles (iodine in potassium iodide, as sold for school use); white tiles or saucers; small samples of potato, bread, rice, apple, table salt, sugar, cooking oil; eye protection.
- Lessons 2–3: fresh spinach leaves (or ivy or another soft, thin leaf); a single-hole paper punch; 10 ml plastic syringes without needles; sodium hydrogen carbonate (baking soda); washing-up liquid; clear plastic cups; an LED desk lamp (LEDs stay cool); a ruler or metre stick; a box or cupboard for dark cups; stopwatches.
- Lesson 4: bromothymol blue indicator solution (school-strength); boiling tubes or clear jars with lids or bungs; aluminium foil; pondweed (for example Elodea or Egeria bought from an aquarium shop); one new straw per student; a lamp.
- Student record sheets (tables are given in each lesson).

Assessment

- Ongoing: closing check questions at the end of each lesson (answers included).
- Lesson 3: the results table, line graph and conclusion are a practical skills task.
- Lesson 5: a 10-question unit check (20 marks) with an answer guide and marking notes.

Sources

These are general references that a teacher can use to check facts. Links were checked to load on 2026-11-04.

- Wikipedia, "Photosynthesis": https://en.wikipedia.org/wiki/Photosynthesis
- Wikipedia, "Cellular respiration": https://en.wikipedia.org/wiki/Cellular_respiration
- Wikipedia, "Jan Baptist van Helmont" (willow tree experiment): https://en.wikipedia.org/wiki/Jan_Baptist_van_Helmont
- Wikipedia, "Joseph Priestley": https://en.wikipedia.org/wiki/Joseph_Priestley
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- Wikipedia, "Elodea": https://en.wikipedia.org/wiki/Elodea
- Wikipedia, "Carbon dioxide": https://en.wikipedia.org/wiki/Carbon_dioxide
- Wikipedia, "Carbon cycle": https://en.wikipedia.org/wiki/Carbon_cycle
- Wikipedia, "Compensation point": https://en.wikipedia.org/wiki/Compensation_point
- Wikipedia, "Fermentation": https://en.wikipedia.org/wiki/Fermentation

A teacher should prefer their national curriculum documents and school science-safety guidance where these exist.

Known gaps and cautions

- **Simplifications (labelled for teachers):** the word equations hide many steps (light-dependent reactions, the Calvin cycle, glycolysis and so on). "Glucose" stands for the sugars plants make. Respiration "releases" energy; it does not "make" it. Anaerobic respiration and fermentation are mentioned only briefly (grade 6 yeast). Leaf discs float because oxygen collects in the air spaces inside the leaf; the rising rate is a rough measure of photosynthesis minus respiration, not a pure measure of photosynthesis.
- **Van Helmont:** he concluded the extra mass came from water. That was partly right: water supplies hydrogen and oxygen, but most of the dry mass comes from carbon dioxide in the air, which he could not know about. Present him as a careful measurer who drew a reasonable but incomplete conclusion.
- **Safety:** eye protection for iodine and indicator work; iodine stains skin and clothes. Students only ever **blow out** through straws, never suck, and each uses a new straw. Use LED lamps (cool) and keep electrical leads away from water. Syringes have no needles. Pondweed is an invasive species in many places: buy it from a shop, never collect it from or release it into ponds or streams, and dispose of it in general waste. Check local rules, because some species are banned. No leaf-boiling in ethanol in this unit.
- Not aligned to any official standard yet. Times are estimates. Leaf disc timings vary a lot with the leaf, the lamp and the water temperature, so trial the method first.
- No images are included; teachers will want a diagram of a leaf cross-section and photos of stomata.

Lesson 1 — Where does a tree come from?

Back to unit

Goal

Students meet the puzzle of where a plant's mass comes from, learn the word equation for photosynthesis, and use the iodine test to find starch, the store a plant makes from the sugar it produces.

Materials

- A large potted plant or a photo of a big tree; a seed (for example a bean or an acorn)
- Dilute iodine solution in dropper bottles (one per group); white tiles or saucers
- Small samples: raw potato slice, bread, cooked rice, apple slice, a pinch of table salt, a pinch of sugar, a few drops of cooking oil
- Eye protection; paper towels
- Record table (below)

Steps

✎ Opening (5 min)

Hold up the seed, then show the tree. Ask: "This tree started as a seed smaller than my fingernail. It now weighs as much as a car. Where did all that stuff come from?" Students write a one-line guess on a sticky note. Collect them; most will say "the soil" or "water". Keep them for the end of the lesson.

✎ Main activity (35 min)

Part A — Van Helmont's willow (10 min). Tell the story. In the 1600s Jan Baptist van Helmont, a Flemish doctor and chemist, planted a small willow in a pot of soil that he had weighed. For five years he added only rainwater and kept the pot covered so dust could not get in. At the end the tree had gained about 74 kg. The soil had lost only about 57 g.

Ask pairs: "If the tree got its mass from the soil, what should have happened to the soil?" (It should have lost about 74 kg.) "So where could the mass have come from?" Van Helmont said water. Tell students he was partly right, and that the rest of the answer is something he couldn't weigh: the air.

Part B — The equation (5 min). Write on the board:

> carbon dioxide + water → glucose + oxygen (needs light energy, captured by chlorophyll)

Explain: the carbon in a tree's wood comes from carbon dioxide gas that enters the leaves through tiny pores called stomata. Water comes up from the roots. Light provides the energy.

Chlorophyll, the green pigment inside chloroplasts, captures the light. Glucose is a sugar; the plant uses it for energy and to build itself. Oxygen goes out into the air.

Part C — The starch test (20 min). Plants turn much of their glucose into starch to store it. Iodine solution is orange-brown; it turns blue-black when it touches starch.

1. Eye protection on. Each group puts the seven samples on a tile, spaced apart.
2. Before testing, groups predict "starch" or "no starch" for each.
3. Add one or two drops of iodine to each sample. Wait one minute.
4. Record the colour.

Sample	Prediction	Colour after iodine	Starch?
Potato			
Bread			
Rice			
Apple			
Salt			
Sugar			
Oil			

Expected: potato, bread and rice go blue-black. Salt, sugar and oil stay orange-brown. Apple varies: unripe apple shows some starch, and ripe apple shows little, because the starch turns to sugar as it ripens. Sugar is a useful surprise: plants make sugar, but table sugar is not starch, so the test is negative.

✓ Discussion questions (with example answers)

1. Potato is a part of a plant that grows underground, in the dark. How can it be full of starch? — The leaves made the sugar in the light; the plant carried it down and stored it in the potato as starch.
2. Van Helmont kept the pot covered. Why did that matter? — So that dust or soil couldn't fall in and add mass; otherwise the soil weighing wouldn't be trustworthy.
3. Is the iodine test showing photosynthesis happening? — No. It shows that starch is there, which is evidence that photosynthesis happened earlier.

✓ Closing check (5 min, with answers)

1. Write the word equation for photosynthesis. — carbon dioxide + water → glucose + oxygen (light, chlorophyll).
2. Most of a tree's dry mass comes from: (a) soil (b) air (c) fertiliser. — (b) air (carbon dioxide).
3. What colour does iodine turn with starch? — Blue-black.

Return the sticky notes. Students who wrote "soil" annotate their own note with one sentence explaining why it is mostly not the soil.

Vocabulary

photosynthesis, carbon dioxide, oxygen, glucose, starch, chlorophyll, chloroplast, stomata (singular: stoma)

Differentiation

- **Support:** give a part-filled equation with word cards to place; give the results table with predictions already sorted into two columns.
- **Stretch:** "Soil does supply something small but important. What?" (Minerals such as nitrogen and magnesium, in small amounts; magnesium is part of chlorophyll.) Ask how van Helmont's experiment could be improved (repeat with several trees; dry and weigh the soil; measure the water added).

⚠ Safety

- Eye protection. Iodine stains skin and clothes; wipe spills straight away.
- Nothing in this lesson is eaten, including the food samples after testing. Bin them.
- Check for food allergies before handling bread (wheat/gluten) and other samples.

Teacher notes and common misconceptions

- "Plants eat soil" or "plant food comes from the soil" is extremely common, even in adults. Garden "plant food" is fertiliser, which supplies minerals, not energy.
- Students often think gases have no mass. If they struggle, weigh a sealed fizzy drink bottle, open it, let it go flat overnight and weigh again; it loses a little mass as carbon dioxide escapes.
- Hydrogen and oxygen in the plant come mostly from water, and carbon mainly from carbon dioxide. At grade 7 "mostly from the air, with water" is enough.

Lesson 2 — Leaves make oxygen: floating leaf discs

Back to unit

Goal

Students see evidence that leaves give off a gas in the light and not in the dark, using small leaf discs that sink and then float as oxygen collects inside them. They also learn the method they will use for the fair test in Lesson 3.

Materials (per group of 3–4)

- 3 fresh spinach leaves (thin, soft leaves work best; avoid thick waxy ones)
- Single-hole paper punch
- One 10 ml plastic syringe, **no needle**
- Bicarbonate solution, made by the teacher: about 1/8 teaspoon (roughly 0.5 g) of sodium hydrogen carbonate (baking soda) stirred into 300 ml water, plus 1 small drop of washing-up liquid
- Plain water with 1 small drop of washing-up liquid (no bicarbonate), for the extra cup
- 3 clear plastic cups, labelled A, B and C
- An LED desk lamp; a box or cupboard for the dark cup
- Stopwatch; record table

Steps

✎ Opening (5 min)

Recap the equation: carbon dioxide + water → glucose + oxygen. Ask: "If leaves really give off oxygen, how could we see it?" Take ideas (bubbles; collect the gas). Then tell students the story of Jan Ingenhousz, who in 1779 showed that underwater plants give off bubbles from their green parts in sunlight, and that the bubbles stop in the shade.

Explain the trick: a leaf has air spaces inside it. If we pull the air out, the leaf disc sinks. If it then makes oxygen, the gas fills the spaces and the disc floats again.

✎ Main activity (35 min)

1. **Punch discs (5 min).** Punch 30 discs, avoiding the big veins. Keep them on a damp paper towel.
2. **Sink the discs (10 min).** For each set of 10 discs:
3. Take the plunger out of the syringe. Drop 10 discs into the barrel. Put the plunger back and push it gently down to just above the discs.
4. Draw up about 5 ml of solution. Point the tip upwards and push out the air.
5. Put a finger over the tip and pull the plunger back slowly. Hold for 10 seconds; this pulls air out of the leaf. Release.
6. Repeat 2–3 times until most discs sink. Tap the syringe if discs stick to the side.

7. Pour the discs and the liquid into a cup with about 3 cm of the same liquid. Any disc that is still floating is taken out and replaced.
8. **Set up three cups.**
9. **A:** bicarbonate solution, about 10 cm under the lamp.
10. **B:** bicarbonate solution, in the dark box.
11. **C:** plain water (no bicarbonate), about 10 cm under the lamp.
12. **Record (15 min).** Every minute, count the floating discs in A and C. Lift the lid on B only at 5, 10 and 15 minutes, and do it quickly.

Time (min)	Floating in A (light + bicarbonate)	Floating in B (dark + bicarbonate)	Floating in C (light, no bicarbonate)
0	0	0	0
1		–	
2		–	
…			
15			

Expected pattern: discs in A begin to rise after a few minutes, and most float by 10–15 minutes. Discs in B stay down. Discs in C stay down or rise only very slowly. The times vary a lot, so trial the method beforehand.

✓ Discussion questions (with example answers)

1. Why is the bicarbonate there? — It gives the water dissolved carbon dioxide, which the leaf needs to photosynthesise.
2. What does cup C tell us? — Light alone isn't enough; without a carbon dioxide supply, the discs make little oxygen.
3. What does cup B tell us? — Without light, the discs don't make enough oxygen to float, even with carbon dioxide.
4. Can we be sure the gas is oxygen? — Not from this test alone. Ingenhousz and others tested the gas. We are using their result and our equation, and we should say so.

✓ Closing check (5 min, with answers)

1. Why do the discs sink after we use the syringe? — We pulled the air out of the spaces inside the leaf.
2. Why do discs in the light rise again? — Photosynthesis makes oxygen, which fills the air spaces.
3. Name the two things the leaf needed that we tested today. — Light and carbon dioxide.

Vocabulary

air spaces, dissolved, control, rate, evidence

Differentiation

- **Support:** one student counts, one times, one records; give a table with the minutes already filled in.
- **Stretch:** "The discs are also respiring all the time, using up some oxygen. What does that mean about the rate we are measuring?" (It is photosynthesis minus respiration, so the real rate of photosynthesis is a bit higher.)

⚠ Safety

- Syringes have no needles. Don't point a syringe at anyone.
- The lamp is an LED; keep the lead and plug away from the cups of liquid, and wipe spills straight away.
- Baking soda solution is not for tasting; wash hands after the practical.

Teacher notes and common misconceptions

- Make the bicarbonate solution fresh each day; too much bicarbonate can slow the discs down, so stick to a small amount.
- If discs won't sink, add one more tiny drop of washing-up liquid (it helps the liquid get into the leaf) and repeat the vacuum step.
- Some students think the bubbles are "air" or "carbon dioxide coming out". Link back to the equation: oxygen is the product.
- Keep the discs for no more than one lesson; they won't work well the next day.

Lesson 3 — More light, faster photosynthesis? A fair test

Back to unit

Goal

Students plan and carry out a fair test of how the distance of a lamp (and so the light intensity) affects the rate of photosynthesis, using the floating leaf disc method from Lesson 2. They draw a line graph and write a conclusion that uses evidence.

Materials (per group of 3–4)

- As in Lesson 2: spinach leaves, hole punch, 10 ml syringe (no needle), freshly made bicarbonate solution with a drop of washing-up liquid, 3 clear cups
- An LED desk lamp; a metre stick or ruler
- Stopwatch; graph paper; record table
- If possible, dim the room lights or close the blinds

Steps

✎ Opening (5 min)

Ask: "In Lesson 2, discs in the light floated and discs in the dark didn't. What do you predict will happen with some light: a lamp far away?" Students write a prediction with a reason, using "the closer the lamp…, the … ".

✎ Main activity (35 min)

Plan (8 min). As a class, agree on the variables before anyone starts.

- **Change (independent variable):** distance from the lamp to the cup: 10 cm, 20 cm, 40 cm.
- **Measure (dependent variable):** the time for 5 of the 10 discs to float. A shorter time means a faster rate.
- **Keep the same (control variables):** type of leaf; 10 discs per cup; the same bicarbonate solution; the same depth of liquid; the same lamp; the same starting time; room lighting.

Ask: "Why use an LED lamp and not an old bulb that gets hot?" (A hot lamp would warm the closer cups more, so temperature would change as well as light, and the test wouldn't be fair.)

Do (22 min). Each group sinks three sets of 10 discs (the method is in Lesson 2) and sets up the three cups at the three distances, measuring from the bulb to the middle of the cup. Start the stopwatch for all three together. Record the time at which the 5th disc floats in each cup. Stop at 25 minutes. If 5 discs haven't floated by then, record "more than 25 min".

Distance from lamp (cm)	Time for 5 discs to float (min) — our group	Class median (min)
10		
20		
40		

Collect every group's times on the board and find the median for each distance. The median is the middle value; one odd result doesn't pull it much.

Example class results (for the teacher; real results will differ):

Distance (cm)	Group times (min)	Median (min)
10	6, 7, 5, 6, 14	6
20	9, 10, 8, 11, 9	9
40	16, 18, 15, >25, 17	17

The 14 at 10 cm is probably a mistake, such as discs not properly sunk or a lamp knocked out of place. The median handles it.

Graph (5 min). Students plot the class medians: distance on the x-axis, time for 5 discs to float on the y-axis, joined with a line. Ask: "What shape is it?" (As the distance goes up, the time goes up, so the rate goes down.)

✓ Discussion questions (with example answers)

1. Write a conclusion. — "The closer the lamp, the shorter the time for 5 discs to float, so the faster the rate of photosynthesis. At 10 cm the median was 6 minutes; at 40 cm it was 17 minutes."
2. Why did we use the time for 5 discs and not for all 10? — Some discs are damaged or stuck and may never float; the time for half of them is more reliable.
3. Does more light always mean faster photosynthesis? — Not forever. At some point something else runs out (carbon dioxide, or warmth), and more light stops helping. Ask students to suggest a test.
4. How could we make the results more trustworthy? — Repeat each distance; use more distances; check the temperature of each cup with a thermometer.

✓ Closing check (5 min, with answers)

1. In this test, what did we change, and what did we measure? — Changed: distance from the lamp. Measured: time for 5 discs to float.
2. Group times at 20 cm were 9, 10, 8, 30, 9 minutes. What is the median? Which value is probably a mistake? — Median 9 minutes; 30 is probably a mistake.
3. A student says, "Cup C was warmer because the lamp was close, so it isn't a fair test." What could they change? — Use an LED lamp that stays cool, or put a clear tray of water between the lamp and the cup, and check the temperatures.

Vocabulary

independent variable, dependent variable, control variable, light intensity, rate, median, line graph, conclusion

Differentiation

- **Support:** give a planning frame with the three variable types as headings; give pre-drawn graph axes with scales.
- **Stretch:** "Light intensity falls off quickly with distance. If you halve the distance, roughly how much brighter is it?" (About four times brighter for a small lamp; this is the inverse square idea, a simplification for a desk lamp.) Students compare whether their times look like a four-times difference and suggest reasons why not.

⚠ Safety

- As Lesson 2: no needles; LED lamp; keep leads and plugs away from water; wipe spills.
- Don't move lamps while they are switched on and near the cups; switch off, move, then switch on.

Teacher notes and common misconceptions

- Students often write "the closer the lamp, the more photosynthesis" without numbers. Ask for one number from the table in each conclusion.
- "Rate" is the tricky idea: a shorter time means a faster rate. Some students may want to calculate a rate as 1 ÷ time; that's a good stretch but not required.
- Results vary between groups. That's normal, and it's the reason we pool data and take a median.

Lesson 4 — Respiration never stops: the indicator tubes

Back to unit

Goal

Students learn the word equation for aerobic respiration, show that their own breath contains carbon dioxide, and use an indicator to show that pondweed takes in carbon dioxide in the light and gives it out in the dark, because it respires all the time.

Materials (per group of 3–4)

- Bromothymol blue (BTB) indicator solution, school strength, diluted with water so it is a clear blue (the teacher prepares this)
- A small beaker; **one new straw per student**
- 4 boiling tubes or small clear jars with bungs or lids, labelled A–D; a rack
- 2 pieces of pondweed (for example Elodea or Egeria from an aquarium shop), each about 8 cm long
- Aluminium foil; an LED lamp or a bright windowsill
- Eye protection; record table

Steps

✎ Opening (10 min)

Write the respiration equation next to the photosynthesis one:

> glucose + oxygen → carbon dioxide + water (energy is released)
>
> carbon dioxide + water → glucose + oxygen (light energy is needed)

Ask: "What do you notice?" (They are the reverse of each other.) Explain that respiration happens inside the cells of all living things, in structures called mitochondria. It releases the energy stored in glucose. Breathing is how animals like us move air in and out; it is not the same thing as respiration.

The indicator. Show the blue BTB. Explain that it is blue when there is little carbon dioxide, and turns green and then yellow as more carbon dioxide dissolves (the water becomes slightly acidic).

Demonstration of breath. Eye protection on. A student blows out gently through a straw into the beaker of BTB for up to a minute. It turns green, then yellow. Ask: "Where did the carbon dioxide come from?" (From respiration in the student's cells, carried to the lungs by the blood.)

✎ Main activity (30 min)

1. Each group blows gently through their straws into their BTB until it is **yellow-green**. Everyone blows out only; no one sucks. Use new straws.
2. Fill the four tubes with this yellow-green solution, almost to the top.
3. Set up:
4. **A:** pondweed, in the light
5. **B:** pondweed, wrapped completely in foil (dark)
6. **C:** no pondweed, in the light
7. **D:** no pondweed, wrapped in foil
8. Bung the tubes. Put them about 15 cm from the LED lamp, or on a bright windowsill.
9. Predict the colour of each tube after one day, and give a reason.
10. Record the colour at the end of the lesson (there may be only a small change) and again the next day.

Tube	Pondweed?	Light?	Colour at start	End of lesson	Next day
A	yes	yes	yellow-green		
B	yes	no	yellow-green		
C	no	yes	yellow-green		
D	no	no	yellow-green		

Expected next day: **A** turns blue (the plant took in carbon dioxide). **B** turns more yellow (the plant gave out carbon dioxide). **C** and **D** stay about the same.

✓ Discussion questions (with example answers)

1. Why did tube B go more yellow? — In the dark there is no photosynthesis, but the plant is still respiring, so it gives out carbon dioxide.
2. Tube A was also respiring. Why did it go blue? — In bright light, photosynthesis takes in carbon dioxide faster than respiration gives it out, so overall the carbon dioxide goes down.
3. What are tubes C and D for? — They are controls. They show that light, the foil or the tube by itself doesn't change the colour; the plant does.
4. A student says "plants photosynthesise in the day and respire at night". What is right and wrong? — Right that photosynthesis only happens in the light. Wrong that respiration is only at night: it happens all the time, day and night.

✓ Closing check (5 min, with answers)

1. Write the word equation for aerobic respiration. — glucose + oxygen → carbon dioxide + water (energy released).
2. What colour is BTB with a lot of carbon dioxide? With little? — Yellow; blue.
3. Which living things respire: plants, animals, fungi, or all three? — All three (and bacteria too).

Vocabulary

respiration, aerobic, mitochondria (singular: mitochondrion), indicator, acidic, control

Differentiation

- **Support:** give colour cards (blue, green, yellow) to hold up for predictions; give a sentence frame: "In tube __ the colour went __ because the plant was __."
- **Stretch:** "What would happen to tube A in very dim light?" (It might stay green: photosynthesis and respiration could balance. This is the compensation point.) Students could design a test with tubes at different distances.

⚠ Safety

- Eye protection for BTB. Wipe spills; BTB can stain.
- **Blow out only, never suck.** Each student uses a new straw; no sharing. Students with asthma or breathing difficulties can watch or record instead of blowing.
- LED lamp, leads away from water.
- **Pondweed:** buy it from a shop. Never collect it from, or put it into, ponds, streams or drains, because many pondweeds are invasive. Dispose of it in general waste. Check local rules, as some species are banned in some places.
- Wash hands after handling pondweed and indicator.

Teacher notes and common misconceptions

- "Respiration = breathing" is very common. Separate them clearly: breathing moves air; respiration is a chemical process in cells.
- "Plants don't respire" or "plants only respire at night" are both common. Tube B is the key evidence.
- "Respiration makes energy" — energy is released from glucose, not made.
- BTB batches vary; test one tube with pondweed in the week before. If tube A doesn't change, the light may be too dim or the pondweed too old; use fresh, bright green shoots.

Lesson 5 — Two processes, one carbon cycle + unit check

Back to unit

Goal

Students connect photosynthesis and respiration to a simple carbon cycle, explain why a growing forest takes carbon out of the air, and complete the unit check.

Materials

- Large sheet or board for a class carbon-cycle diagram; arrow cards
- Six labelled cards: AIR (carbon dioxide), PLANTS, ANIMALS, DECOMPOSERS (fungi and bacteria), DEAD MATERIAL, FUELS (wood, coal, oil, gas)
- Results from Lessons 1–4 on display
- Unit check sheets (below), one per student

Steps

✎ Opening (5 min)

Show the class results from tubes A and B. Ask: "If the plant takes in carbon dioxide in the day and gives it out at night, does it end up with more carbon or less?" (A growing plant ends up with more. Over a whole day it takes in more than it gives out; that's how it grows. Van Helmont's willow is the evidence.)

✎ Main activity (15 min) — building the carbon cycle

1. Put the six cards on the board.
2. Groups come up and add arrows, saying the process each time:
3. AIR → PLANTS: photosynthesis
4. PLANTS → AIR, ANIMALS → AIR, DECOMPOSERS → AIR: respiration
5. PLANTS → ANIMALS: eating (feeding)
6. PLANTS and ANIMALS → DEAD MATERIAL: dying, dropping leaves, waste
7. DEAD MATERIAL → DECOMPOSERS: decomposition (link to the grade 6 fungi unit)
8. FUELS → AIR: burning (combustion)
9. Ask: "Which arrow takes carbon out of the air?" (Only photosynthesis, in this diagram.) "Which arrows put it back?" (Respiration by every living thing, decomposition, burning.)

✓ Discussion questions (with example answers)

1. Why do people say a young, growing forest takes carbon out of the air? — While trees are growing, photosynthesis takes in more carbon dioxide than the forest gives out, and the carbon is stored in wood.

2. What happens to that carbon if the trees are burned, or die and rot? — It returns to the air as carbon dioxide, by burning, or by the respiration of decomposers.
3. Where did the carbon in coal come from? — From plants that photosynthesised millions of years ago and were buried before they fully decayed.

✓ Unit check (25 min)

Ten questions, 20 marks. Allow about 25 minutes. There is no pass mark; use the results to see what to revisit.

1. Write the word equation for photosynthesis. Say what else is needed. **(2)**
2. Write the word equation for aerobic respiration. **(2)**
3. Van Helmont's willow gained about 74 kg in five years. The soil lost about 57 g. (a) What did this show about the soil? (b) Where do we now know most of the extra mass came from? **(2)**
4. Iodine was added to four foods. Potato and rice went blue-black. Sugar and salt stayed orange-brown. Which foods contain starch? Why is the sugar result not a sign that plants don't make sugar? **(2)**
5. Five groups timed how long it took for 5 leaf discs to float with a lamp at 20 cm: 8, 9, 22, 10, 9 minutes. (a) What is the median? (b) Which time is probably a mistake? **(2)**
6. In the leaf disc test, name the variable that was changed and one variable that was kept the same. **(2)**
7. Tube X: pondweed in yellow-green indicator, kept in bright light. Tube Y: the same, wrapped in foil. Predict the colour of each the next day. **(2)**
8. A student writes: "Plants photosynthesise in the day and respire at night instead." Correct the sentence. **(2)**
9. Name the process that takes carbon dioxide out of the air, and two processes that put it back. **(2)**
10. A farmer says plants get their food from the soil, because they grow better when she adds fertiliser. Explain what the fertiliser does provide and what it does not. **(2)**

Answer guide and marking notes

1. carbon dioxide + water → glucose + oxygen (1); light (energy) and chlorophyll are needed (1). Accept "sugar" for glucose.
2. glucose + oxygen → carbon dioxide + water (1 for the reactants, 1 for the products). Accept "energy released" written on the arrow; don't penalise its absence.
3. (a) The tree's mass didn't come (mostly) from the soil (1). (b) From the air, as carbon dioxide (1). "Water and carbon dioxide" gets the mark; "water" alone does not.
4. Potato and rice (1). Table sugar isn't starch, so iodine doesn't test for it; plants make sugar and store much of it as starch (1).
5. (a) 9 minutes (1). (b) 22 minutes (1).
6. Changed: distance from the lamp / light intensity (1). Kept the same: any one of type of leaf, number of discs, solution, depth, lamp, temperature (1).
7. X: blue (1). Y: more yellow (1).
8. Photosynthesis happens only in the light (1), but respiration happens all the time, day and night (1).
9. Photosynthesis (1); any two of respiration, decomposition, burning/combustion (1 for both).

10. Fertiliser provides minerals (such as nitrogen) that plants need in small amounts (1). It does not provide energy or most of the plant's mass; plants make their own food (glucose) by photosynthesis (1).

Closing (5 min)

Students write one sentence answering the question from Lesson 1: "Where did the tree come from?" Compare it with their sticky note from the first lesson.

Vocabulary

carbon cycle, combustion, decomposition, fossil fuel, carbon store, fertiliser, minerals

Differentiation

- **Support:** read the unit check aloud; give a word bank (photosynthesis, respiration, glucose, oxygen, carbon dioxide, water, light, chlorophyll); allow the class carbon-cycle diagram to stay on display.
- **Stretch:** "Burning wood and respiration both release carbon dioxide from glucose-based material. How are they alike and different?" (Both use oxygen and give out carbon dioxide and water, releasing energy. Burning is fast, hot and uncontrolled; respiration is slow, controlled and happens inside cells.)

⚠ Safety

- No practical work in this lesson. Dispose of the Lesson 4 pondweed in general waste, never in drains, ponds or streams.

Teacher notes and common misconceptions

- Students may think "only plants are in the carbon cycle". Every respiring organism is part of it.
- Avoid saying that trees "clean" the air in the sense of removing pollution; the point here is carbon dioxide and oxygen.
- Climate change links are a natural next step, but this unit keeps to the processes. Handle the topic with care; some students find it worrying.

Grade 8 Science — Acids, alkalis and indicators: reading the colour of a liquid

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (an AI agent) on 2026-11-04. No teacher has checked it yet. Read it fully, adapt it to your class and local rules, and test any practical work yourself before using it with students.

Back to all units

Big idea

Many liquids are acidic, alkaline or neutral, and we cannot tell which by looking. An indicator is a dye that changes colour depending on how acidic or alkaline a liquid is, so it lets us "read" a liquid safely without tasting or touching it. The pH scale (usually 0 to 14) puts this on a number line: below 7 is acidic, 7 is neutral, above 7 is alkaline. When an acid and an alkali are mixed in the right amounts they cancel each other out (neutralisation), making a salt and water. People use this every day, from indigestion tablets to farmers adding lime to sour soil.

Outcomes

By the end of the unit, students can:

1. Make a red cabbage indicator and use it to sort everyday liquids into acidic, neutral and alkaline, recording colours in a table.
2. Place liquids on the pH scale using universal indicator, and explain that below 7 is acidic, 7 is neutral and above 7 is alkaline.
3. Write the word equation acid + alkali → salt + water, and explain that adding a carbonate or hydrogencarbonate (such as baking soda) to an acid also gives off carbon dioxide.
4. Carry out a repeated, fair comparison of how much alkali is needed to neutralise two acids, and use the median of repeats.
5. Explain two real uses of neutralisation (antacids for indigestion; lime for acidic soil) and what "ocean acidification" does and does not mean.
6. Correct the common ideas that "all acids burn", "alkalis are safe", "neutral means no chemicals" and "an indicator turns a liquid into an acid".

Prior knowledge

- Some substances dissolve to make solutions; mixtures can be separated; some changes make new materials, and a gas given off is a sign of this (grade 5).
- Bromothymol blue changes colour when carbon dioxide dissolves in water (grade 7).
- Fair tests: change one thing, keep the rest the same, repeat, use the median (grades 3–7).

Lessons (about 50 minutes each)

#	Lesson	Practical?
1	Can you tell by looking? Making a red cabbage indicator	Make indicator; test 8 liquids
2	The pH scale and universal indicator	Universal indicator paper; rank liquids

#	Lesson	Practical?
3	Cancelling out: neutralisation by drops	Count drops of baking soda solution to neutralise vinegar and lemon juice
4	Neutralisation at work: stomachs, soils and seas	Test soil samples; antacid demonstration; ocean pH data
5	Acids and alkalis in the world + unit check	Discussion and written assessment

Materials (whole unit)

- Eye protection for everyone in every practical lesson.
- Lesson 1: red cabbage (about a quarter of a head per class); a kettle (teacher only); a heatproof jug; a sieve; clear plastic cups or spotting tiles; droppers; labelled test liquids (see lesson 1): lemon juice, white vinegar, fizzy (carbonated) water, tap water, salt solution, baking soda (sodium hydrogencarbonate) solution, milk of magnesia, and washing soda (sodium carbonate) solution made up dilute by the teacher.
- Lesson 2: universal indicator paper and its colour chart (or universal indicator solution); the same liquids; tweezers or glass rods.
- Lesson 3: cabbage indicator; white vinegar; lemon juice; baking soda solution (1 level teaspoon in 100 ml water, made up fresh); 10 ml plastic syringes or measuring cylinders; droppers; white tiles.
- Lesson 4: three soil samples (for example garden soil, a peat-free compost and soil from under conifers, or whatever is available); distilled or deionised water; filter paper and funnels; universal indicator paper; one antacid tablet or milk of magnesia (teacher demonstration only).
- Student record sheets (tables are given in each lesson).

Assessment

- Ongoing: closing check questions at the end of each lesson (answers included).
- Lesson 3: the results table, medians and conclusion are a practical skills task.
- Lesson 5: a 10-question unit check (20 marks) with an answer guide and marking notes.

Sources

These are general references that a teacher can use to check facts. Links were checked to load on 2026-11-04.

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- Wikipedia, "Ocean acidification": https://en.wikipedia.org/wiki/Ocean_acidification
- Wikipedia, "Acid rain": https://en.wikipedia.org/wiki/Acid_rain

Known gaps and cautions

- **Not reviewed** by a teacher or a science technician. Check every practical against your school's or region's chemical safety guidance before use.
- **Only household-strength chemicals** are used by students. Laboratory acids and alkalis (such as hydrochloric acid or sodium hydroxide solution) are left out on purpose; a teacher who wants them should follow local guidance for concentrations.
- **Colours vary.** Red cabbage colours depend on the cabbage, the water and how strong the extract is. Test every liquid yourself the day before and use your own results as the answer key. The colours given here are typical, not guaranteed.
- **Tap water varies** from place to place and may not read exactly 7.
- **Simplifications:** "acid + alkali → salt + water" is taught as a word equation only. Hydrogen ions, the logarithmic pH scale (one pH step is a tenfold change) and weak versus strong acids are introduced only as stretch ideas and are covered properly in grades 9–10.
- The ocean pH figures (about 8.15 in 1950 to about 8.05 now) come from Wikipedia's "Ocean acidification" article; check a current scientific source before quoting them as exact.

Lesson 1 — Can you tell by looking? Making a red cabbage indicator

Back to unit

Goal

Students see that acidic, neutral and alkaline liquids can look the same, make a natural indicator from red cabbage, and use it to sort eight everyday liquids into three groups.

Materials

- Eye protection for everyone.
- Red cabbage extract, made by the teacher before the lesson or as a demonstration: chop about a quarter of a red cabbage, cover it with just-boiled water from a kettle in a heatproof jug, leave 10–15 minutes until the water is deep purple, then sieve and cool. Store covered in a fridge for up to two days.
- Per group: 8 clear cups or a spotting tile, a dropper of cabbage extract, a white sheet of paper underneath, a record table.
- Eight labelled liquids, about 20 ml each per group:
- A lemon juice
- B white vinegar
- C fizzy (carbonated) water, freshly opened
- D tap water
- E salt solution (1 teaspoon table salt in 100 ml water)
- F baking soda solution (1 teaspoon sodium hydrogencarbonate in 100 ml water)
- G milk of magnesia (shake well, then dilute 1 part to 4 parts water)
- H washing soda solution (made up dilute by the teacher: 1 teaspoon sodium carbonate in 200 ml water)

Steps

✎ Opening (5 min)

Hold up two cups of clear liquid: one of tap water and one of white vinegar diluted to look the same. Ask: "Which one is safe to drink? How could we find out without tasting or touching?" Take ideas. Establish the rule for the whole unit: **in science we never taste or touch unknown liquids.** We need a safe way to "read" a liquid.

✎ Main activity (30 min)

1. **The cabbage changes colour (teacher demo, 5 min).** Pour a little purple cabbage extract into three cups. Add a few drops of vinegar to one (it turns pink-red) and a pinch of baking soda to another (it turns blue-green). Leave the third alone. Ask: "What made the colour change? Did the cabbage turn the vinegar into something else?" Explain: the cabbage contains a coloured pigment (an anthocyanin) that is one colour

in acidic liquids, another in neutral ones and others in alkaline ones. A dye like this is called an **indicator**.
2. **Predict (5 min).** Groups look at the eight liquids and predict each one: acid, neutral or alkali. They write predictions in pen before testing.
3. **Test (15 min).** Put about 1 cm of each liquid in a cup (or a few drops in a spotting tile well). Add 5 drops of cabbage extract. Swirl. Record the colour against the white paper.

Liquid	Prediction	Colour with cabbage	Group (acid / neutral / alkali)
A lemon juice			
B vinegar			
C fizzy water			
D tap water			
E salt solution			
F baking soda			
G milk of magnesia			
H washing soda			

1. **Build the colour key (5 min).** As a class, line the cups up from red through purple to green-yellow. The typical pattern:
2. **red / pink / magenta** = acidic (lemon juice, vinegar; fizzy water is usually a paler pink-purple)
3. **purple** = about neutral (salt solution; tap water is usually purple or close to it)
4. **blue / green** = alkaline (baking soda, milk of magnesia)
5. **green-yellow** = more strongly alkaline (washing soda)

Teacher: use your own results from testing the day before. Colours vary with the cabbage and water.

✓ Discussion questions (10 min)

1. **Were any of your predictions wrong? Which ones surprised you?** Example answer: "We thought fizzy water would be neutral because it's just water, but it went pinkish so it's slightly acidic." (Carbon dioxide dissolves in water and makes it slightly acidic — the same idea as the bromothymol blue tubes in grade 7.)
2. **Salt solution and tap water look the same as vinegar. Why can't we use our eyes?** Example answer: "Acids and alkalis are often colourless; you can only tell with a test."
3. **Is lemon juice dangerous? Is washing soda safe?** Example answer: "Lemon juice is an acid but we eat it, so not all acids are dangerous. Washing soda is an alkali and it can hurt your eyes and skin, so alkalis are not automatically safe." (Strength and concentration matter more than the label "acid" or "alkali".)
4. **Did the cabbage turn the vinegar into an acid?** Example answer: "No. The vinegar was already an acid. The cabbage just shows it by changing colour."

✓ Closing check (5 min, answers below)

1. What is an indicator?

2. A liquid turns cabbage indicator green. Is it acidic, neutral or alkaline?
3. Name one acidic and one alkaline liquid from today.

Answers: 1. A substance (often a dye) that changes colour depending on whether a liquid is acidic, neutral or alkaline. 2. Alkaline. 3. Acidic: lemon juice, vinegar or fizzy water. Alkaline: baking soda solution, milk of magnesia or washing soda solution.

Vocabulary

acid, alkali, neutral, indicator, pigment, anthocyanin, prediction

Differentiation

- **Support:** give a printed colour strip (red → purple → green → yellow) with "acid", "neutral" and "alkali" labels to match against. Reduce to five liquids (A, B, D, F, H).
- **Stretch:** try other coloured plant juices the teacher has prepared (for example blueberry juice) and compare them with cabbage. Blueberry juice also turns redder with acid and more blue-violet with alkali. Which indicator shows the difference more clearly?

⚠ Safety

- Eye protection on throughout. If anything goes in an eye, rinse with plenty of clean water and tell the teacher.
- **Never taste** any liquid in the lab, even ones that are food at home.
- The teacher handles the kettle and hot water. Let the extract cool before students use it.
- Washing soda solution is an irritant: the teacher makes it up dilute, students wear eye protection, and spills are wiped up straight away. Wash hands after the lesson.
- **Never use bleach, oven cleaner or drain cleaner** in this lesson. Drain cleaners often contain sodium hydroxide, which is highly corrosive. Never mix household cleaning products.
- Cabbage extract stains clothes and benches; use trays.

Teacher notes and misconceptions

- **"All acids burn."** Many acids are weak or dilute and are in food (citric acid in lemons, acetic acid in vinegar). Strong, concentrated acids are dangerous.
- **"Alkalis are safe because they're not acids."** Strong alkalis such as sodium hydroxide are as dangerous as strong acids.
- **"Neutral means no chemicals in it."** Salt solution is neutral and is full of dissolved salt. Neutral describes acidity, not purity.
- **"The indicator makes the liquid acidic."** The indicator only shows what is already there.
- Fizzy water loses its carbon dioxide once opened, so it may drift towards purple over a lesson. Open it just before use.
- Milk of magnesia is cloudy; let it settle a moment and look at the colour of the liquid above, or dilute it more.

Lesson 2 — The pH scale and universal indicator

Back to unit

Goal

Students use universal indicator to give liquids a pH number, place them on the 0–14 scale, and compare three indicators (cabbage, litmus, universal indicator) to see what each can and cannot tell us.

Materials

- Eye protection for everyone.
- Per group: universal indicator paper cut into 1 cm strips (or universal indicator solution and a spotting tile), the colour chart supplied with it, tweezers or a glass rod, a white tile.
- Red and blue litmus paper (a few strips per group).
- The eight liquids from lesson 1 (A–H), freshly poured.
- A long paper strip or masking tape line across the board, marked 0 to 14.
- "pH cards" for the closing sort (see Main activity part 4).

Steps

✎ Opening (5 min)

Show last lesson's cabbage results. Ask: "Lemon juice and fizzy water were both 'acid'. Are they equally acidic? How could we tell?" Take ideas. Explain that scientists use a number scale, the **pH scale**, which usually runs from 0 to 14:

- below 7 = **acidic** (the lower the number, the more acidic)
- 7 = **neutral** (pure water at room temperature)
- above 7 = **alkaline** (the higher the number, the more alkaline)

✎ Main activity (30 min)

1. **Universal indicator (15 min).** Universal indicator is a mixture of several indicators, so it changes through many colours instead of two or three. Show the colour chart: red, orange and yellow mean acidic; green means neutral; blue and violet mean alkaline. For each liquid, dip a rod in and touch it onto a fresh strip of paper (or add 2 drops of indicator solution to a few drops of liquid). Match the colour to the chart **within 30 seconds** and record the pH number.

Liquid	Cabbage group (lesson 1)	Universal indicator colour	pH (from chart)
A lemon juice			
B vinegar			
C fizzy water			

Liquid	Cabbage group (lesson 1)	Universal indicator colour	pH (from chart)
D tap water			
E salt solution			
F baking soda			
G milk of magnesia			
H washing soda			

1. **Line them up (5 min).** Each group sends one person to stick a label for each liquid on the class 0–14 line. Discuss disagreements: "Why might two groups get different numbers for the same liquid?" (Reading colours is a judgement; strips can be left too long; liquids were poured at different times.) Agree a class value for each liquid and mark ranges where groups disagree.
2. **Litmus: a yes/no indicator (5 min).** Give red and blue litmus paper. Students test lemon juice, salt solution and baking soda solution. Blue litmus turns red in acid; red litmus turns blue in alkali; in a neutral liquid neither changes much. Ask: "What can universal indicator tell you that litmus can't?" (How acidic or alkaline: a number, not just acid or alkali.)
3. **pH cards (5 min).** Groups place these cards on the class line. The values are typical figures from reference sources:
4. pure water: 7
5. human blood: about 7.4 (slightly alkaline)
6. seawater: about 8.05 (slightly alkaline)
7. most drinking water: between 6.5 and 8.5
8. acid rain: on average about 4 to 5
9. citrus fruit and vinegar: below 4.6

✓ Discussion questions (10 min)

1. **Which indicator would you choose to check whether a swimming pool is slightly too acidic, and why?** Example answer: "Universal indicator, because it gives a number. Litmus would only say acid or not."
2. **Blood is about 7.4. Is blood acidic, neutral or alkaline?** Example answer: "Slightly alkaline, because it's just above 7."
3. **Acid rain has a pH of about 4 to 5. Why might that harm a lake?** Example answer: "It makes the lake water more acidic than normal, and the living things there are used to water around neutral." (Acid rain is linked to harm to fish, forests and soils.)
4. **Some indicators have only two colours (litmus; phenolphthalein, which is colourless in acid and pink in alkali). Why might a scientist still use them?** Example answer: "When you only need to know if you've gone past a certain point, like when an acid has been neutralised, a sharp change from one colour to another is easier to see."

✓ Closing check (5 min, answers below)

1. A liquid has pH 3. Another has pH 6. Which is more acidic?
2. What colour would universal indicator turn in a neutral liquid?

3. Give one advantage of universal indicator over litmus.

Answers: 1. pH 3 (lower number = more acidic). 2. Green. 3. It shows how acidic or alkaline something is (a pH number), not just whether it is acidic or alkaline.

Vocabulary

pH, pH scale, universal indicator, litmus, phenolphthalein, colour chart, range

Differentiation

- **Support:** give a pre-printed 0–14 line coloured like the universal indicator chart, with "acid", "neutral" and "alkali" bands. Students stick small coloured dots for each liquid.
- **Stretch:** the pH scale is not like a ruler. Each step of 1 means a **tenfold** change in acidity. So pH 3 is 10 times more acidic than pH 4, and 100 times more acidic than pH 5. How many times more acidic is acid rain at pH 4 than water at pH 6? (100 times.) This is a simplified introduction; the reason (hydrogen ion concentration and logarithms) comes in later grades.

⚠ Safety

- Eye protection on throughout.
- Never taste the liquids. Universal indicator solution is often made in alcohol, which is flammable: keep it away from flames.
- Universal indicator and cabbage stain skin; use tweezers or a rod, not fingers. Wash hands at the end.
- Dispose of used strips in the bin, not the sink.

Teacher notes and misconceptions

- **"pH 7 always means water."** pH 7 means neutral; salt solution is also about 7.
- **"A higher pH number means more acid."** It is the opposite. Many students think "higher = more". Use the line repeatedly.
- **"The pH scale stops at 0 and 14."** It is usually drawn from 0 to 14, but very concentrated strong acids and alkalis can go beyond it. Mention only if students ask.
- Universal indicator paper keeps changing colour if left; reading quickly matters.
- Tap water results vary by area. Accept your own measured value.

Lesson 3 — Cancelling out: neutralisation by drops

Back to unit

Goal

Students neutralise an acid by adding an alkaline solution drop by drop, watching the indicator change, and carry out a repeated, fair comparison of two acids (vinegar and lemon juice) using the median number of drops.

Materials

- Eye protection for everyone.
- Per group: two clear cups or small beakers; a white tile or paper underneath; two 10 ml plastic syringes (no needles) or small measuring cylinders; one dropper used only for the baking soda solution; cabbage indicator from lesson 1; a stirring rod or spoon; a record table.
- White vinegar and lemon juice (bottled lemon juice gives more consistent results than fresh lemons).
- Baking soda solution: 1 level teaspoon (about 5 g) sodium hydrogencarbonate stirred into 100 ml water, made up fresh. Make one large batch for the whole class so every group uses the same solution.
- Water for diluting.

Teacher trial: do the whole method the day before. With 1 ml of acid, expect something in the region of 20–40 drops, but the number depends on your vinegar (vinegar can contain anywhere from about 4% to 18% acetic acid), your lemon juice, your teaspoon and your dropper. Adjust the acid volume so groups need roughly 15–40 drops.

Steps

✎ Opening (5 min)

Recap: acids are below 7, alkalis above 7. Ask: "What do you think happens if you mix an acid and an alkali?" Take predictions ("they explode", "they fizz", "you get something in the middle"). Tell students they will find out, and count exactly how much it takes.

✎ Main activity (30 min)

1. **Watch it happen (teacher demo, 5 min).** Put 1 ml of vinegar and 10 ml of water in a cup with 10 drops of cabbage indicator: it is pink-red. Add baking soda solution a few drops at a time, swirling. Students see:
2. **fizzing** — a gas is given off (carbon dioxide; links to grade 5's bicarbonate and vinegar balloon);
3. the colour moving from pink towards **purple** (neutral);

4. if you keep going, it turns **blue-green** (now alkaline: too much has been added).

Explain: the acid and the alkali **cancel each other out**. This is called **neutralisation**. The general word equation is:

acid + alkali → salt + water

Baking soda is a hydrogencarbonate, so here there is also a gas:

acid + hydrogencarbonate → salt + water + carbon dioxide

("Salt" is a family of substances; table salt is only one of them.)

1. **The question (2 min).** "Which needs more baking soda solution to neutralise it: 1 ml of vinegar or 1 ml of lemon juice?" Students predict and give a reason.
2. **Plan it fairly (3 min).** Ask what must stay the same: the volume of acid (1 ml, measured with a syringe), the added water (10 ml), the number of indicator drops (10), the same dropper, the same baking soda batch, and the same end point (**the first time the colour stays purple for 10 seconds after swirling**). What changes: the type of acid. What we measure: the number of drops.
3. **Do it (15 min).** Each group does **three repeats for each acid**, rinsing the cup between runs. Add one drop at a time, swirl, wait, then add the next.

Acid	Run 1 (drops)	Run 2	Run 3	Median
Vinegar				
Lemon juice				

Example results (made-up numbers to show the method, not a prediction):

Acid	Run 1	Run 2	Run 3	Median
Vinegar	31	29	30	**30**
Lemon juice	25	27	41	**27**

Point out the 41: it is far from the other two. The group probably overshot the purple and went into blue. The median (27) is not dragged up by the mistake, which is why we use it.

1. **Conclude (5 min).** Each group writes one sentence: "The ___ needed more drops of baking soda solution (median ___ drops compared with ___), so 1 ml of it contained more acid to cancel out." Compare across groups. Do all groups agree on which needs more?

✓ Discussion questions (10 min)

1. **Why do we count drops instead of just saying "a bit more"?** Example answer: "Numbers let us compare fairly and check if other groups got the same result."
2. **Why did we use the same baking soda batch and the same dropper for everyone?** Example answer: "If one group's solution was stronger or their drops were bigger, they'd need fewer drops, and it wouldn't be a fair comparison."
3. **When the mixture is purple, are there still chemicals in it?** Example answer: "Yes. There's water and a salt dissolved in it. Neutral doesn't mean empty."

4. **Where did the fizz come from, and where did it go?** Example answer: "Carbon dioxide gas was made when the baking soda reacted with the acid, and it escaped into the air."

✓ Closing check (5 min, answers below)

1. Complete: acid + alkali → _____ + _____.
2. A group's results for one acid are 18, 19 and 33 drops. What is the median, and which result is probably a mistake?
3. What colour shows that the cabbage-indicator mixture has just been neutralised?

Answers: 1. Salt + water. 2. Median 19; the 33 is probably a mistake (overshooting the end point). 3. Purple.

Vocabulary

neutralisation, salt, word equation, end point, hydrogencarbonate, carbon dioxide, median, repeat

Differentiation

- **Support:** give a step card with pictures (measure 1 ml → add 10 ml water → add 10 drops indicator → add baking soda one drop at a time → stop at purple). Do two repeats instead of three.
- **Stretch:** name the salts. Vinegar contains acetic acid, so the salt is sodium acetate; lemon juice contains mainly citric acid, so the salt is sodium citrate. Why might two acids need different amounts even if they are the same volume? (They may be different concentrations, and different acids can cancel out different amounts of alkali per molecule. This is covered properly in grades 9–10.)

⚠ Safety

- Eye protection on throughout.
- Syringes have **no needles**.
- Never taste any mixture, even though the ingredients come from a kitchen.
- Wipe spills straight away; the fizzing mixture can bubble over if baking soda is added too fast.
- Mixtures can go down the sink with plenty of water. Wash hands at the end.

Teacher notes and misconceptions

- **"Neutralisation destroys the chemicals."** It makes new substances (a salt and water, plus carbon dioxide here). Mass is not lost; the carbon dioxide escapes into the air.
- **"Acid + alkali always fizzes."** Only acids with carbonates or hydrogencarbonates give carbon dioxide. Acid + an alkali such as sodium hydroxide gives no gas.
- **"Purple means pure water."** It means neutral.

- Overshooting is the most common error: insist on one drop at a time near the end, and swirling. The colour change near neutral can be gradual; agree as a class what "purple" looks like by keeping one neutral cup (salt solution + indicator) as a reference.
- Results differ between brands of vinegar and lemon juice, so the class answer is "which needed more with our bottles", not a general rule.

Lesson 4 — Neutralisation at work: stomachs, soils and seas

Back to unit

Goal

Students measure the pH of real soil samples, watch a model of how an antacid works, and use real data to explain what "ocean acidification" means and what it does not mean.

Materials

- Eye protection for everyone.
- Three soil samples, labelled X, Y and Z, collected by the teacher (for example: garden or field soil, peat-free compost, and soil from under conifers or from a heather or rhododendron bed if available). About 2 tablespoons of each per group.
- Per group: three clear cups or jars with lids, distilled or deionised water (tap water can change the result), filter paper and a funnel (or a coffee filter), universal indicator paper and chart, a teaspoon, a record table.
- Teacher demonstration: a clear jug or large beaker, white vinegar diluted about 1 part to 10 parts water, cabbage indicator, and either one antacid tablet or 1–2 teaspoons of milk of magnesia.
- Printed ocean pH card (see part 3).

Steps

✎ Opening (5 min)

Ask: "Where outside a lab might people want to neutralise something?" Take ideas. Introduce the three places in today's lesson: **inside your stomach, in the soil, and in the sea.**

✎ Main activity (30 min)

1. **Soil pH (15 min).**
2. Put 1 heaped teaspoon of soil in a cup. Add about 50 ml of distilled water. Put the lid on and shake for 30 seconds. Leave it to settle for 5 minutes.
3. Filter the cloudy water into a clean cup (it does not have to be perfectly clear).
4. Test the liquid with universal indicator paper. Record the colour and pH.
5. Repeat for all three soils.

Soil	Where it came from	Indicator colour	pH
X			
Y			
Z			

Then share some facts about soils: - Soil pH matters because it controls which nutrients plants can take up. Most plants grow best between about **pH 5.5 and 7.5**. - Some plants prefer **acidic** soil: rhododendrons, heathers (Erica), Scots pine. Others prefer **limey (alkaline)** soil: ash trees, lilac, clematis. - Farmers and gardeners can **neutralise acidic soil** by adding lime (calcium hydroxide) or crushed limestone (calcium carbonate). Soil that is too alkaline can be made more acidic with sulfur.

Ask: "Which of our soils would suit a rhododendron? Which would a farmer want to lime?"

1. **A model of an antacid (teacher demo, 7 min).** Explain: your stomach makes acid to help digest food. Sometimes it causes discomfort (heartburn, indigestion). An **antacid** is a medicine that neutralises some of the stomach acid. Many contain an alkaline substance such as magnesium hydroxide (milk of magnesia) or a carbonate.
2. Pour the dilute vinegar into the jug and add cabbage indicator: pink-red. "This is our pretend stomach acid." (Real stomach acid is hydrochloric acid and much more acidic. Vinegar is only a safe stand-in.)
3. Crush and add the antacid tablet, or stir in the milk of magnesia. Stir and wait. The colour moves towards purple, or beyond into blue. If the tablet contains a carbonate, it fizzes.

4. Ask: "Which word equation from last lesson is this?" (acid + alkali → salt + water; with a carbonate, also carbon dioxide.)

5. **What is happening to the sea? (8 min).** Hand out the ocean pH card:

   Between 1950 and today, the average pH of the ocean surface fell from about **8.15** to about **8.05**. The main cause is carbon dioxide from human activities: some of the extra carbon dioxide in the air dissolves in the sea and makes it slightly more acidic. Seawater is **still alkaline** (above pH 8). This change is called **ocean acidification**. Animals that build shells or skeletons from calcium carbonate, such as corals and molluscs, are especially at risk.

Link to grade 7: the bromothymol blue tubes turned yellow when students breathed carbon dioxide into them. The same thing happens, very slowly, to the ocean.

Ask: "Is the sea now acidic?" (No. It is still alkaline, just less alkaline than before. "Acidification" means moving towards the acidic end, not arriving there.)

✓ Discussion questions (10 min)

1. **Why did we shake the soil with distilled water instead of tap water?** Example answer: "Tap water has its own pH, which might change the result. Distilled water doesn't add anything."
2. **A gardener's soil is pH 4.5 and her vegetables grow badly. What could she do, and why does it work?** Example answer: "Add lime. It's alkaline, so it neutralises some of the acid in the soil and raises the pH towards the 5.5 to 7.5 that most plants like."
3. **Why is vinegar only a model of stomach acid?** Example answer: "Real stomach acid is a different, stronger acid. Vinegar is safe to use in class, but it doesn't behave exactly the same."

4. **A headline says "The oceans are turning to acid." What is right and wrong about it?** Example answer: "Right: the pH is going down, so the sea is becoming more acidic. Wrong: the sea is still alkaline, above 8, not an acid."

✓ Closing check (5 min, answers below)

1. What type of substance is used to treat soil that is too acidic?
2. What does an antacid do in the stomach?
3. The ocean's surface pH went from about 8.15 to about 8.05. Did it become more acidic or more alkaline? Is it acidic now?

Answers: 1. An alkaline substance or a carbonate, such as lime or crushed limestone. 2. It neutralises some of the stomach acid. 3. More acidic (the pH went down); no, it is still alkaline (above 7).

Vocabulary

soil pH, lime, limestone, antacid, indigestion, ocean acidification, calcium carbonate, model

Differentiation

- **Support:** test two soils instead of three; give a sentence frame for the ocean question ("The pH went ___, so the sea became more ___. It is still ___ because its pH is above 7.").
- **Stretch:** the ocean's pH fell by only 0.1. Using the "each step of 1 is ten times" rule from lesson 2, a drop of 0.1 is about a 26% increase in acidity (because 10 to the power 0.1 is about 1.26). Why might a small-looking change in pH still matter to sea life? Acid rain (lesson 2) has been reduced in Europe and North America since the 1970s by laws cutting sulfur dioxide and nitrogen oxide emissions. What would cutting ocean acidification need?

⚠ Safety

- Eye protection on throughout.
- **Students do not handle antacid tablets or other medicines.** The teacher does the antacid demonstration and disposes of any leftover tablet safely. Students should never take medicine without an adult's permission.
- Wear gloves or wash hands well after handling soil. Collect soil only from places free of animal droppings, sharp objects and garden chemicals. Cover cuts.
- Never taste any of the mixtures.

Teacher notes and misconceptions

- **"Ocean acidification means the sea is acid."** The sea is still alkaline; the pH is falling.
- **"Plants all like neutral soil."** Many plants are adapted to acidic or alkaline soils; the "best" pH depends on the plant.
- **"Antacids get rid of all the acid."** They neutralise some of it; the stomach needs acid to digest food.

- Soil results depend on the soil-to-water ratio and on the soil itself. A cheap soil-testing kit from a garden centre can be used instead of indicator paper.
- If compost results look surprising, that is a good discussion point: many composts and potting mixes are deliberately adjusted by the manufacturer.

Lesson 5 — Acids and alkalis in the world + unit check

Back to unit

Goal

Students pull the unit together by sorting real-life situations, then complete a 10-question unit check (20 marks).

Materials

- A set of 10 situation cards per group (listed below).
- Three large labels per group: ACIDIC, NEUTRAL, ALKALINE, plus a fourth: NEUTRALISATION.
- Printed unit check (questions below), one per student.

Steps

✎ Opening (5 min)

Quick-fire recall: teacher calls out a colour and an indicator ("green with universal indicator", "pink with cabbage", "red litmus turns blue") and students hold up A (acid), N (neutral) or K (alkali) cards.

✎ Main activity: situation sort (15 min)

Groups place each card under ACIDIC, NEUTRAL, ALKALINE or NEUTRALISATION and write one reason on a sticky note.

1. Lemon juice in a salad dressing. (Acidic: citric acid.)
2. A bottle of drain cleaner containing sodium hydroxide. (Alkaline, and highly corrosive.)
3. Salt dissolved in pure water. (Neutral.)
4. A person takes an antacid for indigestion. (Neutralisation.)
5. Rain with a pH of 4.5 falling on a forest. (Acidic: acid rain.)
6. A farmer spreading crushed limestone on a field. (Neutralisation of acidic soil.)
7. Human blood at pH about 7.4. (Slightly alkaline.)
8. Vinegar used to pickle vegetables. (Acidic: acetic acid.)
9. Seawater at pH about 8.05. (Alkaline, though becoming less so.)
10. Baking soda added to a cake mixture with an acidic ingredient so that it fizzes and rises. (Neutralisation, giving carbon dioxide.)

Discuss: card 2 and card 1 are both "chemicals from home", but one is food and one is dangerous. What makes the difference? (Strength and concentration, not whether it is an acid or alkali.)

✓ Unit check (25 min)

Students work alone. Calculators are not needed.

Q1. What is an indicator? (2 marks)

Q2. Red cabbage indicator turns: red/pink in liquid P, purple in liquid Q, green in liquid R. Label each as acidic, neutral or alkaline. (2 marks)

Q3. Put these in order from most acidic to most alkaline: blood (pH about 7.4), lemon juice (pH about 2.2), pure water (pH 7), acid rain (pH about 4.5 to 5), washing soda solution (strongly alkaline). (2 marks)

Q4. Give one advantage of universal indicator over litmus paper. (2 marks)

Q5. Complete the word equations. (2 marks) (a) acid + alkali → _____ + _____ (b) acid + hydrogencarbonate → salt + water + _____

Q6. A group neutralised 1 ml of vinegar with baking soda solution three times. They needed 22, 24 and 37 drops. (a) What is the median? (1 mark) (b) Which result is probably a mistake, and what might have caused it? (1 mark)

Q7. In the neutralisation investigation, name two things that must be kept the same to make it a fair comparison. (2 marks)

Q8. A gardener tests her soil and finds it is pH 4.5. Most of her plants grow best between pH 5.5 and 7.5. What could she add, and why does it work? (2 marks)

Q9. A student says: "Alkalis are safe, it's acids you have to be careful with." Do you agree? Explain with an example. (2 marks)

Q10. A news article says: "Ocean acidification means the sea has become an acid." The ocean's average surface pH has fallen from about 8.15 to about 8.05. Explain what is right and what is wrong in the article. (2 marks)

Answer guide and marking notes

Q1. 1 mark: a substance that changes colour. 1 mark: depending on whether a liquid is acidic, neutral or alkaline (or depending on pH). "A colour" alone = 0.

Q2. All three correct (P acidic, Q neutral, R alkaline) = 2 marks; two correct = 1 mark.

Q3. Correct order: lemon juice, acid rain, pure water, blood, washing soda solution. 2 marks for the full order; 1 mark if only one adjacent pair is swapped. (Lemon juice at about pH 2.2 is clearly more acidic than acid rain at about 4.5 to 5. The 2.2 figure is from the Wikipedia "PH" article; real lemons vary a little.)

Q4. 1 mark: universal indicator gives a pH number / shows how acidic or alkaline. 1 mark: litmus only shows acid or alkali (or a full comparison sentence).

Q5. (a) salt + water (1 mark for both). (b) carbon dioxide (1 mark).

Q6. (a) 24. (b) 37; overshooting the end point / adding too many drops past purple / adding drops too quickly (any sensible cause).

Q7. Any two, 1 mark each: volume of acid; volume of added water; number of indicator drops; same dropper; same baking soda solution / batch; same end point colour. "The amount" without saying of what = 0.

Q8. 1 mark: lime / crushed limestone / an alkali or a carbonate. 1 mark: it neutralises some of the acid in the soil and raises the pH (towards 5.5–7.5).

Q9. 1 mark: disagree. 1 mark: an example, such as sodium hydroxide / drain cleaner is a highly corrosive alkali; or washing soda can irritate eyes and skin. Accept "it depends on strength and concentration" with an example.

Q10. 1 mark (right): the pH has fallen, so the sea has become more acidic. 1 mark (wrong): seawater is still alkaline (pH above 7, about 8), so it is not an acid.

Total: 20 marks. No pass mark is set; use the results to see which ideas need revisiting. Common gaps to look for: thinking a higher pH means more acidic (Q3); thinking neutralisation needs no measuring (Q6–Q7); thinking "acidification" means "acidic" (Q10).

Vocabulary review

acid, alkali, neutral, indicator, pH scale, universal indicator, litmus, neutralisation, salt, antacid, lime, ocean acidification

Differentiation

- **Support:** read questions aloud; provide the word bank above; allow Q3 to be done by placing labelled cards on a pH line.
- **Stretch:** add a bonus question (not marked out of 20): "Acid rain at pH 4 is how many times more acidic than water at pH 6?" (100 times.)

⚠ Safety

- No practical work in this lesson.

Teacher notes

- Card 10 (baking soda in a cake) links to the sodium bicarbonate fact that baking powder contains an acid ingredient so that the reaction happens without adding vinegar.
- Card 9's pH figure and Q10's figures come from the Wikipedia "Ocean acidification" article (see unit sources); check a current scientific source before quoting them as exact.
- If students did not get clear results in lesson 3, let them use the example data table from lesson 3 for Q6–Q7 discussion afterwards.

Grade 9 Science — Forces and Newton's laws: measuring what pushes and pulls do

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (an AI agent) on 2026-11-04. No teacher has checked it yet. Read it fully, adapt it to your class and local rules, and test any practical work yourself before using it.

Back to all units

Big idea

Forces change how things move. If the forces on an object are balanced, it keeps doing what it was doing (staying still, or moving at a steady speed in a straight line). If they are unbalanced, it speeds up, slows down or changes direction, and a bigger net force or a smaller mass gives a bigger acceleration (F = ma). Forces always come in pairs acting on two different objects. These ideas are checked here with measured data, not just stated.

Outcomes

By the end of the unit, students can:

1. Explain the difference between mass (kilograms) and weight (a force, in newtons), and calculate weight using W = mg with g about 9.8 N/kg on Earth and about 1.6 N/kg on the Moon.
2. Use a spring and a newtonmeter to collect stretch data, plot a graph and describe when extension is proportional to force (Hooke's law).
3. Draw labelled free-body diagrams, find the net force along a line, and use Newton's first law to predict whether an object's motion will change.
4. Carry out a trolley experiment, calculate acceleration from distance and time, plot acceleration against force, and explain why the line may not pass exactly through zero.
5. Explain terminal velocity using drag and weight, and test it by dropping paper cases.
6. Identify Newton's third-law force pairs and use force and time ideas to explain seat belts and crumple zones.

Prior knowledge

- Pushes and pulls start, stop and turn things; a bigger push makes things go faster or farther; rough surfaces slow things down (kindergarten).
- Magnets pull through some materials, and a pull can act without touching (grade 3).
- Fair tests, repeats and medians; plotting and reading line graphs (grades 3–8).
- Rearranging simple formulas and working with decimals (mathematics, grades 7–8).

Lessons (about 50 minutes each)

#	Lesson	Practical?
1	Mass, weight and stretching springs	Weigh masses with a newtonmeter; spring stretch graph
2		

#	Lesson	Practical?
	Balanced and unbalanced: free-body diagrams and Newton's first law	Coin-on-card demonstration; force-diagram stations
3	F = ma: the trolley experiment	Trolley pulled by hanging masses; time over 1.0 m; graph
4	Falling, drag and terminal velocity	Drop 1–4 nested paper cases from 2.0 m
5	Force pairs, car safety + unit check	Third-law demonstrations; written assessment

Materials (whole unit)

- Lesson 1: newtonmeters (0–10 N); slotted masses (100 g each, with hangers); steel springs; clamp stands with bosses and clamps, weighed down or clamped to the bench; metre rulers; eye protection; a tray or box under every hanging load.
- Lesson 2: a playing card or stiff card, a coin and a cup or beaker for each group (or one for a teacher demonstration); force-diagram station cards (given in lesson 2).
- Lesson 3: dynamics trolleys or low-friction toy cars; a smooth level runway at least 1.5 m long; a bench pulley; string; a 10 g hanger and 10 g or 20 g slotted masses; masking tape; stopwatches or phones; a box of padding or a cushion at the end of the runway; a tray under the hanging masses.
- Lesson 4: paper cupcake or muffin cases (identical, at least 4 per group); metre rulers or a tape measure; stopwatches or phones; masking tape to mark a 2.0 m drop height.
- Lesson 5: two wheeled chairs or skateboards are NOT used (see lesson 5 safety); instead balloons, string, straws and tape for a balloon rocket; two spring newtonmeters hooked together.
- Student record sheets (tables are given in each lesson).

Assessment

- Ongoing: closing check questions at the end of each lesson (answers included).
- Lesson 3: the results table, acceleration calculations, graph and conclusion are a practical skills task.
- Lesson 5: a 10-question unit check (20 marks) with an answer guide and marking notes.

Sources

These are general references that a teacher can use to check facts. Links were checked to load on 2026-11-04.

- Wikipedia, "Newton's laws of motion": https://en.wikipedia.org/wiki/Newton%27s_laws_of_motion
- Wikipedia, "Force": https://en.wikipedia.org/wiki/Force
- Wikipedia, "Net force": https://en.wikipedia.org/wiki/Net_force
- Wikipedia, "Free body diagram": https://en.wikipedia.org/wiki/Free_body_diagram
- Wikipedia, "Inertia": https://en.wikipedia.org/wiki/Inertia
- Wikipedia, "Mass versus weight": https://en.wikipedia.org/wiki/Mass_versus_weight
- Wikipedia, "Weight": https://en.wikipedia.org/wiki/Weight
- Wikipedia, "Standard gravity": https://en.wikipedia.org/wiki/Standard_gravity
- Wikipedia, "Gravity of Earth": https://en.wikipedia.org/wiki/Gravity_of_Earth
- Wikipedia, "Moon": https://en.wikipedia.org/wiki/Moon
- Wikipedia, "Newton (unit)": https://en.wikipedia.org/wiki/Newton_(unit)

- Wikipedia, "Hooke's law": https://en.wikipedia.org/wiki/Hooke%27s_law
- Wikipedia, "Spring scale": https://en.wikipedia.org/wiki/Spring_scale
- Wikipedia, "Acceleration": https://en.wikipedia.org/wiki/Acceleration
- Wikipedia, "Velocity": https://en.wikipedia.org/wiki/Velocity
- Wikipedia, "Friction": https://en.wikipedia.org/wiki/Friction
- Wikipedia, "Drag (physics)": https://en.wikipedia.org/wiki/Drag_(physics)
- Wikipedia, "Terminal velocity": https://en.wikipedia.org/wiki/Terminal_velocity
- Wikipedia, "Momentum": https://en.wikipedia.org/wiki/Momentum
- Wikipedia, "Crumple zone": https://en.wikipedia.org/wiki/Crumple_zone
- Wikipedia, "Seat belt": https://en.wikipedia.org/wiki/Seat_belt

Known gaps and cautions

- **Not reviewed** by a teacher or a science technician. Check every practical against your school's or region's safety guidance before use.
- **Example data are invented for teaching**, chosen to look like typical classroom results. They are not real measurements. Run each practical yourself first and use your own results as the answer key.
- **Hand timing is rough.** Human reaction time adds error to short times (about 1–2 s here). That is a point to discuss, not to hide; light gates, data loggers or slow-motion phone video give better times if available.
- **Simplifications:** $a = 2d/t^2$ assumes the trolley starts from rest and accelerates steadily. Momentum is mentioned only in lesson 5 to explain car safety; impulse calculations, vectors at angles and circular motion are left to later grades.
- **Facts to check before quoting as exact:** standard gravity 9.80665 m/s² ("Standard gravity"); sea-level gravity from about 9.780 m/s² at the Equator to about 9.832 m/s² at the poles ("Gravity of Earth"); Moon surface gravity 1.62 m/s², about a sixth of Earth's ("Moon"); a belly-down skydiver's terminal speed about 55 m/s ("Terminal velocity"); seat belts "reduce serious crash-related injuries and deaths by about half" (CDC summary quoted in "Seat belt").

Lesson 1 — Mass, weight and stretching springs

Back to unit

Goal

Students measure the weight of known masses, work out that each kilogram weighs about 9.8 N on Earth, and collect spring-stretch data to test whether extension is proportional to force.

Materials

- Per group: a 0–10 N newtonmeter; five 100 g slotted masses and a hanger; a steel spring; a clamp stand, boss and clamp (clamped or weighed down so it cannot tip); a metre ruler; a tray or box under the hanging load.
- Eye protection for everyone (springs can snap or fly off).

Steps

✎ Opening (5 min)

Ask: "If you travelled to the Moon, would you weigh less? Would you have less stuff in you?" Take a vote on each question. Leave the answers open; students will be able to answer by the end.

✎ Main activity part A: weighing masses (10 min)

1. Hang 100 g, then 200 g, up to 500 g, on the newtonmeter. Record the reading in newtons.
2. Fill in the table:

Mass (g)	Mass (kg)	Weight (N)	Weight ÷ mass (N/kg)
100	0.1		
200	0.2		
300	0.3		
400	0.4		
500	0.5		

1. Typical readings are close to 1 N per 100 g (a cheap newtonmeter may read 0.9–1.0 N). Weight ÷ mass should come out close to 10 N/kg. The accepted value is about 9.8 N/kg; standard gravity is defined as 9.80665 m/s².
2. Introduce **W = mg**: weight (N) = mass (kg) × gravitational field strength (N/kg). Mass is the amount of matter and is measured in kilograms; weight is a force and is measured in newtons.

✎ Main activity part B: stretching a spring (20 min)

1. Hang the spring from the clamp and measure the length of the coiled part with no load. Put the ruler upright next to it and read at eye level.
2. Add one 100 g mass (about 1 N) at a time, up to 5 N. Measure the length each time and work out the extension (new length − original length).
3. Remove the masses one at a time and check whether the spring goes back to its original length.
4. Plot extension (cm, up) against force (N, along). Example class data (invented for teaching):

Force (N)	0	1	2	3	4	5
Extension (cm)	0	2.1	3.9	6.0	8.1	10.0

1. The points lie close to a straight line through zero: each extra newton stretches the spring by about 2 cm. This is **Hooke's law**: extension is proportional to force, up to a limit. Robert Hooke stated it in 1678 as ut tensio, sic vis ("as the extension, so the force").
2. Stretch: the spring constant k = force ÷ extension = 1 N ÷ 0.02 m = 50 N/m.

✓ Discussion questions (5 min)

1. A student says "my mass is 50 newtons". What is wrong? — Mass is measured in kilograms; newtons are for forces such as weight. Their mass might be 50 kg, which would weigh about 490 N.
2. Why does a newtonmeter contain a spring? — Because the spring's extension is proportional to the force (Hooke's law), so equal steps on the scale mean equal steps of force.
3. What would happen if we kept adding masses? — Eventually the spring would stretch past its limit, stop following the straight line, and not return to its original length. (Do not test this with the class springs.)

✓ Closing check (5 min, answers)

1. A 2 kg bag of flour: what is its weight on Earth (g = 9.8 N/kg)? — **19.6 N.**
2. The Moon's surface gravity is about 1.6 N/kg (1.62 m/s², about a sixth of Earth's). What is the same bag's mass and weight on the Moon? — **Mass still 2 kg; weight about 3.2 N.**
3. Using the example spring (about 2 cm per newton), how far would it stretch with 3.5 N? — **About 7 cm.**

Vocabulary

mass, weight, newton (N), kilogram (kg), gravitational field strength, newtonmeter, extension, proportional, Hooke's law, spring constant

Differentiation

- Support: give a partly filled table and pre-drawn axes; use 1 N steps only.
- Stretch: find the spring constant from the gradient; predict the extension of two identical springs side by side (half) or end to end (double), then test.

⚠ Safety

- Eye protection on throughout part B.
- Clamp stands must be clamped or weighted so they cannot tip. Keep feet and hands out from under hanging masses; a tray or box goes underneath.
- Never stretch springs beyond 5 N in this lesson; overstretched springs can snap or fly off.

Teacher notes and common misconceptions

- "Weight and mass are the same thing." In everyday speech they are; in science, weight is the pull of gravity on a mass. Bathroom scales show kilograms but actually measure a force.
- "There is no gravity in space." Gravity gets weaker with distance but does not vanish; astronauts in orbit are falling around the Earth. Keep this short; it returns in later grades.
- Gravity varies a little over Earth's surface: from about 9.780 m/s² at the Equator to about 9.832 m/s² at the poles (Wikipedia, "Gravity of Earth"). 9.8 N/kg is fine for class work.

Lesson 2 — Balanced and unbalanced: free-body diagrams and Newton's first law

Back to unit

Goal

Students draw free-body diagrams, add forces along a line to find the net force, and use Newton's first law to predict whether an object's motion will change.

Materials

- Per group (or one teacher demonstration): a playing card or piece of stiff card, a coin, and a cup or beaker.
- Six station cards (below), printed and placed around the room.
- Mini whiteboards or paper for diagrams.

Steps

✎ Opening (5 min): the coin and card

Put the card on top of the cup and the coin on the card, over the opening. Flick the card sharply sideways. The card flies off; the coin drops into the cup. Ask: "Why didn't the coin fly off with the card?" Collect ideas. The short answer, built up in this lesson: the quick flick gives only a small, brief sideways force on the coin through friction, so the coin barely moves sideways; once the card is gone, the unbalanced force on the coin is its weight, so it falls.

✎ Main activity part A: drawing free-body diagrams (15 min)

1. Model the rules on the board:
2. Draw the object as a box or dot.
3. Draw each force as an arrow starting on the object, pointing the way the force acts, with length showing size.
4. Label each arrow with its name and size if known (for example "weight 20 N").
5. Only show forces acting **on** this object.
6. Model a book resting on a table: weight 10 N down; the table's push (normal or contact force) 10 N up. Net force = 10 N up − 10 N down = 0 N. **Balanced.**
7. Introduce **Newton's first law** (first published by Isaac Newton in the Principia, 1687): if the net force on an object is zero, it stays at rest or keeps moving at a steady speed in a straight line. Its resistance to changes in motion is called **inertia**.

✎ Main activity part B: force stations (20 min)

Groups visit the stations, draw a free-body diagram for each, find the net force, and say what happens to the motion.

Station	Situation	Forces (given on the card)	Answer: net force and motion
1	Hanging lamp at rest	weight 15 N down; cable pull 15 N up	0 N; stays at rest
2	Bike at steady speed on a flat road	forward push 40 N; air resistance + friction 40 N backward	0 N; keeps the same steady speed
3	Car pulling away	engine force 3,000 N forward; resistance 800 N backward	2,200 N forward; speeds up
4	Sledge sliding on rough snow with nobody pushing	friction 60 N backward; no forward force	60 N backward; slows down
5	Lift starting to go up	cable 9,000 N up; weight 8,000 N down	1,000 N up; speeds up upward
6	Tug-of-war (picture only, do not act it out)	team A 700 N left; team B 650 N right	50 N left; rope and teams start moving left

✓ Discussion questions (5 min)

1. Station 2: "If the bike is moving, there must be more force forward than backward." Is that right? — No. At a steady speed the forces are balanced. An unbalanced force is needed to **change** speed, not to keep moving.
2. Why does a passenger lurch forward when a bus brakes? — The brakes slow the bus, but nothing slows the passenger straight away; their body tends to keep moving at the old speed (inertia) until the seat or a seat belt pushes on them.
3. A spacecraft far from any planet switches its engines off. What happens? — It keeps moving at the same speed in a straight line; nothing is needed to keep it going.

✓ Closing check (5 min, answers)

1. A box has 30 N pushing right and 30 N pushing left. What is the net force, and what could the box be doing? — **0 N; it could be at rest or moving at a steady speed in a straight line.**
2. A skater glides with 5 N of friction backward and no forward force. What happens to her speed? — **It decreases (net force 5 N backward).**
3. Draw a free-body diagram of an apple hanging from a tree. — **Weight down, pull of the stalk up, equal lengths.**

Vocabulary

force, net force (resultant force), balanced, unbalanced, free-body diagram, normal (contact) force, friction, inertia, Newton's first law

Differentiation

- Support: give station cards with the arrows already drawn; students only add labels and the net force.

- Stretch: station 7 (extra): a parachutist just after opening the parachute (drag 1,200 N up, weight 800 N down) — net 400 N up, so she slows down while still moving downward. Ask why "force upward" does not mean "moving upward".

⚠ Safety

- The coin-and-card demonstration uses a plastic cup or a sturdy beaker on a tray; flick sideways, away from faces.
- Tug-of-war is shown as a picture only; rope pulls can cause rope burns, falls and finger injuries.

Teacher notes and common misconceptions

- "Moving things need a force to keep moving." This is the biggest misconception in the unit, and many adults hold it. Everyday objects stop because of friction and air resistance, which are forces; take those away and motion continues.
- "A book on a table has no forces on it." It has at least two, and they are balanced.
- Students often draw forces acting **by** the object (for example the book pushing on the table) on the free-body diagram. Keep asking "is that force acting on this object?"

Lesson 3 — F = ma: the trolley experiment

Back to unit

Goal

Students change the pulling force on a trolley while keeping the total mass the same, calculate acceleration from distance and time, plot acceleration against force, and explain what the graph shows (Newton's second law, F = ma).

Materials

- Per group: a dynamics trolley (or a low-friction toy car of known mass); a smooth, level runway at least 1.5 m long; a bench pulley clamped at one end; about 1.5 m of string; a 10 g hanger and enough 10 g slotted masses to make 80 g in total; masking tape; a stopwatch or phone; a box of padding or a cushion at the pulley end; a tray under the hanging masses.
- Kitchen or lab scales to find the trolley's mass.
- Graph paper or a spreadsheet.

Steps

✎ Opening (5 min)

Recall station 3 from lesson 2 (the car pulling away). Ask: "If we double the unbalanced force, what happens to the acceleration? What if we double the mass instead?" Record predictions.

Setting up (10 min)

1. Mark a start line and a finish line **1.00 m** apart on the runway with tape.
2. Tie the string to the trolley, run it over the pulley and attach the hanger. The falling hanger provides the pulling force.
3. **Keep the total mass the same.** Weigh the trolley and add slotted masses on top so that trolley + everything on it + hanger = 1.0 kg in total (the example uses a trolley of about 0.92 kg plus 80 g of slotted masses and hanger). To change the force, **move** masses from the trolley to the hanger, never add new ones. This way only the force changes.
4. A hanging mass of 20 g pulls with about 0.2 N (using g ≈ 10 N/kg; with 9.8 N/kg it is 0.196 N; the difference is small compared with timing error).

✎ Main activity (20 min)

1. Hold the trolley still at the start line, release (do not push), and time it to the finish line. Do three runs at each force; record the median.
2. Calculate acceleration with **$a = 2d \div t^2$** (d = 1.00 m, starting from rest).
3. Example results (invented for teaching, total mass 1.0 kg):

Pulling force (N)	Run 1 (s)	Run 2 (s)	Run 3 (s)	Median t (s)	a = 2 × 1.00 ÷ t² (m/s²)
0.2	3.6	3.8	3.5	3.6	0.154
0.4	2.4	2.3	2.9	2.4	0.347
0.6	1.9	1.9	2.0	1.9	0.554
0.8	1.6	1.5	1.6	1.6	0.781

1. Plot acceleration (up) against force (along) and draw a line of best fit.

✓ Discussion questions (10 min)

1. What pattern does the graph show? — A straight line: equal increases in force give equal increases in acceleration. Acceleration is proportional to the unbalanced force (for a fixed mass).
2. Why does the line not go exactly through zero? — Friction. Some of the pulling force is used up balancing friction, so the line crosses the force axis a little above zero (in the example, about 0.06 N). The net force is the pull minus friction.
3. The gradient of the example line is about 1.05 m/s² per newton. What does that tell you? — Gradient = a ÷ F = 1 ÷ m, so the mass is about 1 ÷ 1.05 ≈ 0.96 kg, close to the 1.0 kg used.
4. At 0.4 N, run 3 took 2.9 s. What should we do with it? — Use the median (2.4 s), which is not pulled off by one odd run; it was probably a late start or slow stop of the stopwatch.

Introduce **Newton's second law**: F = ma, where F is the net (unbalanced) force in newtons, m the mass in kilograms and a the acceleration in m/s². One newton is the force that gives a 1 kg mass an acceleration of 1 m/s² (1 N = 1 kg·m/s²).

✓ Closing check (5 min, answers)

1. What net force gives a 1,200 kg car an acceleration of 2 m/s²? — **2,400 N.**
2. A 0.5 kg trolley has a net force of 1.5 N. What is its acceleration? — **3 m/s².**
3. Why did we move masses from the trolley to the hanger instead of adding new ones? — **To keep the total mass constant so that only the force changed (a fair test).**

Vocabulary

acceleration, velocity, net force, Newton's second law, gradient, line of best fit, median, friction, reaction time

Differentiation

- Support: give the a = 2d ÷ t² calculations for one row worked out; students complete the rest with a calculator.
- Stretch: keep the force at 0.4 N and change the total mass (add masses to the trolley: 1.0, 1.5, 2.0 kg). Predict, then test, that doubling the mass halves the acceleration. Plot a against 1/m.

⚠ Safety

- Padding or a cushion at the pulley end so the trolley does not fly off the bench; a second student catches it.
- A tray under the hanger; keep feet out from under falling masses.
- Runways on benches, not on the floor where people walk.

Teacher notes and common misconceptions

- "A bigger force means a bigger speed." It means a bigger **acceleration**: the speed keeps increasing for as long as the net force acts.
- Hand timing over 1.5–4 s has an error of roughly 0.1–0.3 s; ask students to estimate how much that changes a. Light gates, a data logger, or counting frames in slow-motion phone video make good upgrades.
- Some trolleys have a friction-compensation trick: tilt the runway very slightly until the trolley, given a small push, rolls at a steady speed. This makes the line pass much closer to zero. It is a good stretch discussion of "balancing friction with a component of weight", which is beyond this unit.

Lesson 4 — Falling, drag and terminal velocity

Back to unit

Goal

Students explain why falling objects stop speeding up (terminal velocity) using drag and weight, and test how the terminal speed of paper cases depends on their weight.

Materials

- Per group: at least 4 identical paper cupcake or muffin cases; a metre ruler or tape measure; masking tape; a stopwatch or phone.
- A marked drop height of **2.0 m** (tape on a wall or door frame). Many students cannot reach 2.0 m standing on the floor. Use a step stool only if your school allows it, with an adult holding it; otherwise use a lower height that everyone can reach standing (for example 1.5 m), mark it, and use that height instead of 2.0 m in the speed calculation (speed = drop height ÷ time).

Steps

✎ Opening (5 min)

Hold a flat sheet of paper and a crumpled sheet of the same size. Ask which will land first, then drop them together. Then drop a book and a flat sheet with the sheet resting on top of the book (they fall together). Ask: "If the paper isn't lighter than it was a moment ago, why did it fall more slowly on its own?" The answer is **air resistance (drag)**, a force that acts against motion through air or water.

Explaining terminal velocity (10 min)

Draw four free-body diagrams for a skydiver:

1. **Just after jumping:** weight large, drag almost zero → net force down → speeds up.
2. **Falling faster:** drag grows as speed grows (at these speeds, roughly with the square of the speed) → net force down but smaller → still speeds up, but less each second.
3. **Terminal velocity:** drag = weight → net force zero → no acceleration; falls at a steady speed. For a belly-down skydiver this is about 55 m/s (Wikipedia, "Terminal velocity").
4. **Parachute opens:** drag suddenly much bigger than weight → net force **up** → slows down (while still moving down) until a new, lower terminal velocity is reached.

✎ Main activity (20 min)

1. Drop one paper case, open side up, from 2.0 m. Time the fall. Three drops; take the median.

2. Repeat with 2, 3 and 4 cases nested together (same shape and size, so the drag at a given speed is about the same, but the weight doubles, triples, quadruples).
3. Paper cases reach terminal velocity very quickly, so the average speed over 2.0 m is close to the terminal speed: **speed ≈ 2.0 m ÷ time**.
4. Example results (invented for teaching):

Cases	Median time (s)	Speed = 2.0 ÷ t (m/s)
1	1.9	1.05
2	1.4	1.43
3	1.15	1.74
4	1.0	2.00

1. Plot speed against number of cases.

✓ Discussion questions (10 min)

1. Does doubling the weight double the terminal speed? — No. In the example, 2 cases fall about 1.4 times as fast as 1, not 2 times. Heavier cases need a bigger drag force to balance them, and drag rises steeply with speed, so a modest rise in speed is enough.
2. Stretch: if drag grows with the square of speed, how much faster should 4 cases fall than 1? — Weight is 4 times bigger, so drag must be 4 times bigger at terminal velocity; speed² must be 4 times bigger, so speed doubles. Example: 1.05 × 2 = 2.1 m/s, close to the measured 2.0 m/s.
3. Why are these times hard to measure well? — They are short (1–2 s), so a reaction time of about 0.1–0.2 s at each end is a big fraction. Repeats and medians help; slow-motion video helps more.
4. Where else does drag matter? — Cyclists crouching, streamlined cars, fish and birds, parachutes, and drag in water when swimming.

✓ Closing check (5 min, answers)

1. A skydiver is falling at a steady speed. Compare the drag and her weight. — **They are equal (balanced); net force zero.**
2. Her parachute opens. Which way is the net force just afterwards, and what happens to her speed? — **Upward; she slows down (but keeps moving downward).**
3. Why does a feather fall more slowly than a hammer on Earth but not on the Moon? — **On Earth air resistance on the feather is large compared with its weight; the Moon has almost no air, so there is no drag and both fall together.**

Vocabulary

air resistance, drag, terminal velocity, streamlined, average speed, reaction time

Differentiation

- Support: give the speed column worked out for one row; focus on the four skydiver diagrams.

- Stretch: test the square relationship by plotting speed² against number of cases (it should be roughly a straight line through zero).

⚠ Safety

- Use a step stool only if your school allows it, with an adult holding it; never stand on chairs or desks. Otherwise reduce the drop height.
- Keep the drop zone clear of people walking past.

Teacher notes and common misconceptions

- "Heavier things always fall faster." Without air, all objects fall with the same acceleration. With air, a heavier object of the **same shape** reaches a higher terminal speed, which is what the paper cases show.
- "At terminal velocity there are no forces." There are two large forces, balanced.
- "When the parachute opens, the skydiver goes up." Video taken from a falling camera can look like this; in fact she slows down, and the camera keeps falling faster.
- Drag growing with the square of speed is a simplification that fits these speeds reasonably well (Wikipedia, "Drag (physics)").

Lesson 5 — Force pairs, car safety + unit check

Back to unit

Goal

Students identify Newton's third-law force pairs, use force and time ideas to explain seat belts and crumple zones, and complete the unit check.

Materials

- Two spring newtonmeters hooked together (one per pair of students).
- Balloon rocket: a long balloon, a drinking straw, about 5 m of smooth string tied tight across the room, tape.
- Unit check sheets.

Steps

✎ Opening (5 min): two newtonmeters

Pairs hook two newtonmeters together and pull gently in opposite directions. Whatever one reads, the other reads the same, even when one student "tries harder". Introduce **Newton's third law**: when object A pushes or pulls on object B, B pushes or pulls on A with a force of the same size in the opposite direction. The two forces act on **different** objects, so they never cancel each other out.

✎ Main activity part A: finding the pairs (10 min)

Teacher demonstration: the balloon rocket. Thread the straw on the string, tape the blown-up (not tied) balloon to the straw, and let go. The balloon pushes air backward; the air pushes the balloon forward.

Students write the partner force for each:

Force	Its third-law partner
Your foot pushes the ground backward as you walk	The ground pushes your foot forward
The Earth pulls an apple down (its weight)	The apple pulls the Earth up, with the same size of force
A swimmer's hands push water backward	The water pushes the swimmer forward
A rocket pushes hot gas downward	The gas pushes the rocket upward

Point out: a book on a table has weight (Earth pulls book) and the table's push (table pushes book). These are equal and opposite but are **not** a third-law pair: both act on the book, and

they are different kinds of force. Its third-law partners are "book pulls Earth" and "book pushes table".

✎ Main activity part B: why seat belts and crumple zones work (10 min)

1. In a crash the car and passengers must lose all their speed. From F = ma, the force on a passenger depends on how quickly they slow down: stopping in a longer time means a smaller acceleration and so a smaller force.
2. **Crumple zones** are parts of a car (usually the front) designed to crush in a controlled way, increasing the time over which the car's speed changes in a collision (Wikipedia, "Crumple zone").
3. **Seat belts** hold the passenger to the car so they slow down with it, instead of continuing forward (first law) and hitting the dashboard or windscreen over a much shorter time. A CDC summary quoted on Wikipedia's "Seat belt" page says seat belts "reduce serious crash-related injuries and deaths by about half".
4. Worked comparison (invented numbers): a 60 kg passenger slows from 15 m/s to 0. If this takes 0.1 s, a = 150 m/s² and F = 60 × 150 = 9,000 N. If a crumple zone and belt stretch it to 0.5 s, a = 30 m/s² and F = 1,800 N, five times smaller.

✓ Unit check (25 min)

10 questions, 20 marks. Use g = 10 N/kg unless told otherwise.

1. A rock has a mass of 3 kg. (a) What is its weight on Earth? (b) What is its mass on the Moon? (2 marks)
2. Explain the difference between mass and weight. (2 marks)
3. A spring stretches 4 cm with 2 N. How far will it stretch with 5 N, assuming it obeys Hooke's law? (2 marks)
4. A cyclist moves at a steady speed with a forward force of 50 N. What is the total backward force? Explain. (2 marks)
5. A 1,000 kg car has an engine force of 2,500 N and resistance of 500 N. (a) What is the net force? (b) What is its acceleration? (2 marks)
6. In a trolley experiment, the repeat times were 2.2 s, 2.3 s and 3.0 s. What value should be used, and why? (2 marks)
7. A trolley experiment gave a straight-line graph of acceleration against force that crossed the force axis at 0.1 N instead of 0. Suggest why. (2 marks)
8. Describe what happens to the forces and the speed of a skydiver from jumping until she reaches terminal velocity. (2 marks)
9. Ana says "When I push on a wall, the wall doesn't push back, because it doesn't move." Is she right? Explain using Newton's third law. (2 marks)
10. Explain how a crumple zone reduces the force on passengers in a crash. (2 marks)

Answer guide and marking notes

1. (a) 30 N (1); (b) 3 kg — mass does not change (1).
2. Mass is the amount of matter, in kg, and is the same everywhere (1); weight is the force of gravity on a mass, in N, and depends on where you are (1).
3. 2 cm per newton (1), so 10 cm (1).
4. 50 N (1); at steady speed the forces are balanced / net force is zero (1).

5. (a) 2,000 N (1); (b) 2 m/s² (1). Allow (b) follow-through from a wrong (a).
6. 2.3 s (1), the median, because 3.0 s is probably a timing mistake and the median is not pulled off by one odd value (1). Accept "the mean of 2.2 and 2.3 after leaving out 3.0" for 1 mark only if a reason is given.
7. Friction (1): some of the pulling force (about 0.1 N) was used to balance friction before the trolley would accelerate (1).
8. At first weight is bigger than drag, so she speeds up (1); drag grows with speed until it equals her weight, then the net force is zero and she falls at a steady (terminal) speed (1).
9. No (1); the wall pushes back on her hand with an equal and opposite force; the wall doesn't move because other forces on it (from the ground and building) balance her push (1).
10. It crushes so the car takes longer to stop (1); a longer stopping time means a smaller acceleration, so from F = ma a smaller force on the passengers (1). Do not award the second mark for "absorbs the force" without the time idea.

There is no pass mark. Use the results to see which ideas to revisit: questions 4, 8 and 9 test the main misconceptions in the unit.

Vocabulary

Newton's third law, force pair, interaction, crumple zone, seat belt, collision

Differentiation

- Support: allow a formula sheet (W = mg, F = ma, a = 2d ÷ t²) and a calculator; read questions aloud if needed.
- Stretch: momentum = mass × velocity. Ask students to show that the passenger's change of momentum in part B is 900 kg·m/s in both cases, and that force × time = 900 in both cases too.

⚠ Safety

- The balloon rocket string is tied at head height or above, across a part of the room where nobody walks during the demonstration. Students with latex allergies do not handle balloons; use latex-free balloons.
- Do not demonstrate the third law with students on wheeled chairs or skateboards pushing each other; falls are a real risk. The newtonmeters show the same idea safely.

Teacher notes and common misconceptions

- "The bigger object pushes harder." In a collision between a truck and a car, the forces on each are equal in size; the car's occupants are hurt more because the same force gives the smaller mass a bigger acceleration.
- "Third-law pairs cancel out." They act on different objects, so they cannot cancel. Only forces on the **same** object add up to a net force.
- Weight and the normal force on a resting book are the classic false pair (see part A).

Grade 10 Science: Counting What You Can't Count — Field Sampling in Ecology (5 lessons)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 4 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules and your local fieldwork policy.

Back to the science progression

Big idea

Ecologists almost never count every living thing. They take careful samples and use them to estimate what they cannot count: how many plants are in a field, how many animals live in a wood, how varied a habitat is. An estimate is only as good as the way the sample was taken, so the method (random, repeatable, honest about its assumptions) matters as much as the arithmetic.

Outcomes

By the end of the unit a student can:

1. Explain why random sampling reduces bias, and show how a chosen ("looks interesting") sample can mislead.
2. Use quadrats with random coordinates to estimate the population density of a plant and scale it up to a whole area, with units.
3. Run a belt or line transect across an environmental gradient, record one abiotic factor alongside the plants, and describe a pattern without claiming more than the data show.
4. Estimate a population with mark-recapture (Lincoln-Petersen and Chapman), and state the assumptions the estimate depends on.
5. Calculate Simpson's index of diversity for two sites and explain why evenness, not just the number of species, affects it.

Prior knowledge

- Grade 6-8: food webs, habitats, fair tests, mean, ratio and percentages.
- Area of a rectangle; using a calculator or spreadsheet.
- Maths link: proportional reasoning (see the maths progression).

Lessons

Lesson	Title	Main activity
1	Why sample, and why randomly?	Paper "field": chosen vs random squares, compare with the true count
2	Quadrats	Estimate daisies (or another plant) on the school field
3	Transects and gradients	Plants vs light or trampling along a line

Lesson	Title	Main activity
4	Mark-recapture	Bean-bag simulation; Lincoln-Petersen and Chapman
5	Measuring diversity	Simpson's index for two sites; end-of-unit check

Materials

- Lesson 1: a printed "field" per pair (a 20 × 20 grid with dots of three colours scattered unevenly; make one with a spreadsheet or by hand), random number tables or a calculator/spreadsheet RAND function.
- Lessons 2-3: per group, a 0.5 m × 0.5 m quadrat (four 50 cm sticks or a wire frame), two 30 m tapes (or one tape plus a marked rope), clipboards, a simple plant identification sheet for your school grounds, pencils. Lesson 3 also: a light meter (or a phone light-sensor app; readings are only comparable on the same phone), and/or a ruler for vegetation height.
- Lesson 4: per group, a cloth bag or opaque tub with 150-400 dried beans (count the true total secretly), a marker pen or a small pot of a second bean colour for "marking".
- Lesson 5: lesson 2-3 data or the provided data, calculators/spreadsheets.

Assessment

- Lesson 2 calculation of density and total estimate, with units.
- Lesson 3 transect write-up: one pattern, one limitation, one next step.
- Lesson 5 end-of-unit check: 7 questions, 25 marks, with worked answers.

⚠ Safety (read before lessons 2 and 3)

- Follow your school's off-site / fieldwork policy. Work on school grounds in sight of an adult; agree boundaries and a recall signal.
- **Ticks:** in long grass and woodland edges, ticks can carry Lyme disease in many regions. Wear long trousers tucked into socks, check skin after fieldwork, and tell students (and families) how to remove a tick and when to see a doctor (see sources). Prefer mown areas in tick season.
- Allergies and stings: know students with severe allergies; carry their medication. Avoid wasps' nests and stinging plants; touch only what the task needs.
- **Do not eat or taste any plant or fungus.** Wash hands after fieldwork.
- Sun and weather: hats, water, sun cream as appropriate; cancel in storms.
- Quadrat sticks are not toys; carry them pointing down.

Ethics

The unit uses a **bean simulation** for mark-recapture. Marking real animals needs care, training and sometimes permission. If you extend to real animals (for example woodlice under logs), use gentle handling, a non-toxic mark that does not affect survival, return animals where they were found, replace logs, and keep the total time short. Leave habitats as you found them.

Sources

All checked to load on 4 November 2026.

- Wikipedia: Quadrat

- Wikipedia: Transect
- Wikipedia: Mark and recapture (Lincoln-Petersen and Chapman estimators, assumptions)
- Wikipedia: Sampling bias
- Wikipedia: Random number generation
- Wikipedia: Biodiversity
- Wikipedia: Diversity index (Simpson and Gini-Simpson; naming confusion)
- Wikipedia: Species richness
- Wikipedia: Species evenness
- Wikipedia: Abiotic component
- Wikipedia: Biotic component
- Wikipedia: Ecological succession (extension)
- Wikipedia: Tick
- Wikipedia: Lyme disease

Known gaps and cautions

- **Names of diversity indices are inconsistent** across textbooks. This unit uses "Simpson's index of diversity" for $1 - \Sigma\, n(n-1) / (N(N-1))$, which ranges from 0 (no diversity) towards 1. Some books call $\Sigma\, p^2$ "Simpson's index" and others report $1/\Sigma\, p^2$. Check which form your exam board uses.
- Confidence intervals for the estimates are not taught; lesson 2 uses the spread of quadrat counts as an informal sense of uncertainty. Grade 11-12 statistics can return to this.
- Percentage cover is mentioned but counts are used in worked examples because they are easier to check.
- Plant identification depends on your region; you need a local sheet.
- The light-sensor reading from a phone is a relative measure only.
- No images, no standards alignment, no educator review.

Lesson 1: Why sample, and why randomly?

Unit overview · Next: Lesson 2

Goal

Students estimate a total from a sample, compare chosen and random samples with the true count, and explain sampling bias.

Materials

- A printed paper "field" per pair: a 20 × 20 grid (400 squares) with about 300-500 dots in three colours (three "species"). Make the dots uneven: clumps in some corners, bare patches elsewhere. Keep the true total of each colour on the teacher's copy only.
- Random numbers: a spreadsheet `RANDBETWEEN(1,20)`, a calculator RAND key, or a printed random number table.

Steps

Opening (5 min). "How many daisies are on the school field? How could you find out without counting all of them?" Collect ideas; most will describe counting part and multiplying.

Main activity (30 min).

1. **Chosen sample.** Each pair picks 10 squares "that look typical", counts the dots in them, and works out: mean per square × 400 = estimated total.
2. **Random sample.** Each pair generates 10 random (column, row) pairs from 1-20, counts those squares and repeats the calculation.
3. Pairs write both estimates on the board. Reveal the true total.
4. Compare: are the chosen estimates scattered, or mostly too high or too low? Are the random estimates centred near the true value?
5. Optional: repeat the random sample with 30 squares. Is the spread of the class's estimates smaller?

Discussion questions (with example answers).

- Why were the chosen samples often too high? People pick squares with something in them, or avoid empty-looking ones. That is a bias: a systematic error, not just bad luck.
- Random samples still disagreed with each other. Why? Chance: with only 10 squares you might hit a clump or a bare patch. That is sampling variation, and it shrinks as samples get bigger.
- What is the difference between bias and variation? Bias pushes estimates the same way every time; variation scatters them around the true value. A bigger sample reduces variation but does not fix bias.
- Why do ecologists use random coordinates in a real field? So that nobody's choices (or the easiest spots to reach) decide where they sample.

Closing check (5 min, with answers).

1. A pair counts 10 random squares and gets a total of 18 dots. Estimate the number in the 400-square field. (Mean 1.8 per square; 1.8 × 400 = 720.)

2. Give one reason a chosen sample can be biased. (People choose squares that look interesting / full / easy to reach.)

Vocabulary

sample, population, estimate, random, bias, sampling variation

Differentiation

- Support: give the 10 random coordinates ready-made.
- Stretch: use a spreadsheet to repeat random samples of 10 and of 30 many times and plot both sets of estimates as histograms.

⚠ Safety

None beyond normal classroom rules.

Teacher notes and misconceptions

- "Random" does not mean "spread out evenly". Some random samples clump; that is fine. (Systematic sampling along a line is a different method, used in lesson 3.)
- Students may think a bigger sample always gives the right answer. Point out that a biased method stays biased however large it is.

Lesson 2: Quadrats

Unit overview · Previous: Lesson 1 · Next: Lesson 3

Goal

Students use random quadrats to estimate the density and total population of one plant species on an area of school grass.

Materials

- Per group: one 0.5 m × 0.5 m quadrat (area 0.25 m²), two tapes laid along two edges of the study area at right angles, random numbers, a clipboard and recording table, the plant identification sheet.
- Choose a target plant that is easy to recognise and count as separate plants (for example daisies, dandelions or plantain rosettes).

Steps

Opening (5 min, indoors). Recap lesson 1. Show the quadrat and work out its area together: 0.5 m × 0.5 m = 0.25 m², so 4 quadrats = 1 m².

Main activity (35 min, outdoors).

1. Lay two tapes along two edges of the study area to make axes. Measure the area of the study rectangle (for example 30 m × 20 m = 600 m²).
2. Each group generates random coordinates (for example x from 0-29, y from 0-19 metres), walks to the point, and places the quadrat's corner there. No "adjusting" the quadrat to a nicer spot.
3. Count plants of the target species whose rooted centre is inside the quadrat. Agree a rule for plants on the edge (for example count those touching the top and left sides, not the bottom and right).
4. Each group takes at least 5 quadrats; pool class data for 20-40.
5. Optional: estimate percentage cover of grass, bare ground and other plants (the quadrat can be strung into 25 small squares; each = 4%).

Worked example (put on the board back indoors).

Ten quadrat counts: 3, 0, 5, 2, 1, 4, 0, 2, 6, 1. - Total = 24; mean = 24 ÷ 10 = 2.4 plants per quadrat. - Density = 2.4 ÷ 0.25 m² = 9.6 plants per m². - Estimated population = 9.6 × 600 m² = 5,760 plants (about 5,800).

Discussion questions (with example answers).

- Why round the answer? With only 10 quadrats, the third and fourth digits are not trustworthy; "about 5,800" is honest.
- Counts ranged from 0 to 6. What does that tell you? The plants are patchy; one quadrat on its own would be a poor guide. More quadrats help.
- Would this estimate work for the whole school grounds? Only for areas like the one sampled (same mowing, shade, trampling).

- Why the edge rule? So plants on the line are not counted twice or never; it keeps the method consistent between groups.

Closing check (5 min, with answers). Eight quadrats (0.25 m² each) give 1, 3, 0, 2, 4, 2, 0, 3 dandelions; the lawn is 400 m². Estimate the population. (Total 15; mean 1.875; density 7.5 per m²; 7.5 × 400 = 3,000.)

Vocabulary

quadrat, density, percentage cover, coordinates, population estimate

Differentiation

- Support: a scaffolded table with columns count → mean → ÷ 0.25 → × area.
- Stretch: compare the estimate from the first 5 quadrats with the estimate from all class quadrats. How much did it change?

⚠ Safety

See the unit safety notes (ticks, allergies, no tasting plants, hand washing, boundaries). Carry quadrats pointing down.

Teacher notes and misconceptions

- The most common error is forgetting to convert per-quadrat to per-m² (dividing by 0.25 = multiplying by 4). Ask for units at every step.
- Some plants (grass, clover) are hard to count as individuals; that is what percentage cover is for.
- Keep the class data: lesson 5 can use it.

Lesson 3: Transects and gradients

Unit overview · Previous: Lesson 2 · Next: Lesson 4

Goal

Students sample along a line that crosses a change in conditions, record an abiotic factor with the plants, and describe a pattern carefully.

Materials

- Per group: a 20-30 m tape, a quadrat, a light meter or phone light-sensor app (same device all along the line), a ruler, plant identification sheet, recording table with one row per sampling point.
- A site with a gradient: from under a tree into open grass; across a trampled path into untrampled grass; or from a wall's shady side outwards.

Steps

Opening (5 min). "Lesson 2 asked how many. Today asks where, and why there?" Show a sketch of the site and ask what changes along the line.

Main activity (35 min, outdoors).

1. Lay the tape straight across the gradient. This is a **line transect**; placing the quadrat along it at regular points makes a **belt transect**.
2. Every 1 or 2 m (agree in advance; this is systematic, not random, sampling), place the quadrat on the same side of the tape and record:
3. which species are present (and counts or percentage cover for 2-3 common ones);
4. the abiotic factor: light reading at ground level, or for a path, the height of the grass / percentage of bare soil as a measure of trampling.
5. Take each light reading the same way: sensor flat, at the same height, not shaded by the student, all readings within a few minutes (clouds change light quickly).

Back indoors (5 min). Plot distance along the transect (x-axis) against light reading, and on the same distance axis, the count or cover of one species.

Discussion questions (with example answers).

- What pattern do you see? For example: "plantain cover was highest where the path was most trampled; grass height was lowest there."
- Does this prove trampling causes more plantain? No. It shows they go together along this line. Something else (soil compaction, moisture) could change too. An experiment or more sites would be needed.
- Why systematic points here, when lesson 1 said random? Here the question is about change along a line, so evenly spaced points make the pattern easier to see. The choice of line is still a judgement and should be described honestly.
- What could make the light readings unfair? Clouds passing, different heights, the student's own shadow, different phones.

Closing check (5 min, with answers).

1. Name one abiotic and one biotic factor you could record on a transect. (Abiotic: light, soil moisture, temperature, pH, trampling; biotic: number of a plant species, grazing marks, shading by a tree.)
2. Write one sentence describing a pattern that does not claim cause. (For example, "Where light was lower, there was less clover.")

Vocabulary

transect, gradient, abiotic, biotic, systematic sampling, correlation

Differentiation

- Support: one species only, with a ready-made table and axes.
- Stretch: repeat the transect 5 m to the side. Is the pattern the same? This is replication.

⚠ Safety

See the unit safety notes. Do not point any sensor at the Sun; do not look at the Sun.

Teacher notes and misconceptions

- Students often write "the plants need less light" for a shade-tolerant species. Prefer "this species was found more where light was lower".
- Ecological succession (bare ground to grass to scrub) can be introduced as an extension if the transect crosses a recently disturbed patch.

Lesson 4: Mark-recapture

Unit overview · Previous: Lesson 3 · Next: Lesson 5

Goal

Students estimate the size of a population that moves around, using a mark-recapture simulation, and state the assumptions behind the estimate.

Materials

- Per group: an opaque bag or tub with a secret number of dried beans (150-400; different per group; the teacher records each total), a marker pen (or a supply of beans of a second colour to swap in as "marked").
- Calculators.

Steps

Opening (5 min). "You can't put a quadrat on woodlice or fish; they move. How could you estimate how many live in a pond?" Introduce the idea: catch some, mark them, let them go, catch again later.

Main activity (30 min).

1. **First capture.** Take a scoop (or a handful) of beans without looking. Count them: this is **M**, the number marked. Mark each one (or swap each for a bean of the second colour). Return them all and mix thoroughly ("let the animals mix back into the population").
2. **Second capture.** Take a second scoop. Count the total, **C**, and how many of these are marked, **R** (recaptured).
3. **Lincoln-Petersen estimate:** $N \approx M \times C \div R$. Reasoning: the fraction marked in the second sample ($R \div C$) should be about the fraction marked in the whole population ($M \div N$).
4. **Chapman estimate** (less biased when samples are small): $N \approx (M + 1)(C + 1) \div (R + 1) - 1$.
5. Repeat steps 1-4 two more times (three rounds in all). Then the teacher reveals the true number.

Worked example. M = 40 marked; second sample C = 50, of which R = 8 are marked.

- Lincoln-Petersen: $40 \times 50 \div 8 = 250$.
- Chapman: $41 \times 51 \div 9 = 232.3...$, then $232.3... - 1 = 231.3...$, about 231.

Discussion questions (with example answers).

- What happens if you do not mix the beans? Marked beans stay together on top, so R is too large and the estimate is too small.
- What if R = 0? Lincoln-Petersen breaks (division by zero); the samples were too small. Chapman still gives a number, but it is very uncertain. Take bigger samples.
- List the assumptions for real animals. The population is closed (no births, deaths, arrivals or departures between captures); marks do not fall off; marking does not change survival or behaviour; marked animals mix fully; every animal is equally likely to be caught.

- Which assumption might fail for woodlice? For trapped mice? Woodlice may hide under the same log they were released from (poor mixing); mice may become "trap-happy" or "trap-shy", changing the chance of recapture.

Closing check (5 min, with answers). 30 snails are marked and released. Later 30 are caught and 6 are marked. Lincoln-Petersen: $30 \times 30 \div 6 = 150$. Chapman: $31 \times 31 \div 7 - 1 = 137.3 - 1 \approx 136$.

Vocabulary

mark-recapture, closed population, assumption, estimator, bias

Differentiation

- Support: a formula card with M, C and R labelled on a picture of two scoops.
- Stretch: use a spreadsheet to simulate 1,000 rounds with a known N and compare the average Lincoln-Petersen and Chapman estimates with N.

⚠ Safety

Dried beans: no eating; sweep up spills (slip risk). See README ethics notes before any work with real animals.

Teacher notes and misconceptions

- The Chapman form here is the one given in the Mark and recapture source. Both estimators assume a closed population.
- Students often mix up C and R. Use the words "caught the second time" and "recaptured (already marked)".

Lesson 5: Measuring diversity

Unit overview · Previous: Lesson 4

Goal

Students calculate Simpson's index of diversity for two sites, explain why evenness matters as well as the number of species, and complete the end-of-unit check.

Materials

- Class data from lessons 2-3 (species counts in quadrats from two areas), or the data below. Calculators or a spreadsheet.

Steps

Opening (5 min). Show two lists. Site A: 4 species. Site B: 4 species. "Which is more diverse?" Most say "the same". Then show the counts.

Species	Site A (mown lawn edge)	Site B (unmown corner)
Grass (counted as tufts)	30	12
Daisy	5	10
Clover	3	9
Plantain	2	9
Total N	**40**	**40**

Main activity (20 min).

Simpson's index of diversity used in this unit:

$D = 1 - \Sigma\, n(n-1) \div (N(N-1))$

where n is the number of individuals of each species and N is the total. D is 0 when every individual is the same species and gets closer to 1 as diversity rises.

Worked, Site A: - $n(n-1)$: $30 \times 29 = 870$; $5 \times 4 = 20$; $3 \times 2 = 6$; $2 \times 1 = 2$. Sum = 898. - $N(N-1) = 40 \times 39 = 1{,}560$. - $D = 1 - 898 \div 1{,}560 = 1 - 0.576 =$ **0.42**.

Students do Site B: $132 + 90 + 72 + 72 = 366$; $D = 1 - 366 \div 1{,}560 = 1 - 0.235 =$ **0.77**.

Then, if there is class data, compute D for the two areas sampled in lessons 2-3.

Discussion questions (with example answers).

- Both sites have four species. Why is B more diverse? B is more even: no species dominates. Picking two individuals at random from A, they are very likely both grass.
- What does D mean in words? The chance that two individuals picked at random (without replacement) are different species.
- Species richness vs evenness? Richness is the number of species; evenness is how equal their numbers are. Simpson's index combines both.

- Why might mowing lower diversity here? A guess to test, not a conclusion: frequent mowing may favour grasses that regrow from the base. We have one site of each, so we cannot separate mowing from other differences.

✓ End-of-unit check (25 marks, 20-25 min)

1. Explain the difference between bias and sampling variation, with one example of each from this unit. **(2)**
2. Six quadrats, each 0.25 m², give these counts of buttercups: 2, 5, 1, 0, 3, 1. The meadow is 250 m². Estimate the buttercup population. Show your working and units. **(4)**
3. A student's transect shows that moss cover is higher where light is lower. They write: "Shade causes moss to grow." Give two reasons this claim goes too far and one way to test it better. **(3)**
4. 60 beetles are marked and released. Later 45 are caught, of which 9 are marked. Calculate the Lincoln-Petersen and Chapman estimates. **(4)**
5. State two assumptions of mark-recapture. **(2)**
6. Calculate Simpson's index of diversity for Site C (four species, 5, 5, 5, 5 individuals) and Site D (17, 1, 1, 1). Explain the difference between them. **(8)**
7. Why can species richness alone be misleading when comparing habitats? **(2)**

Answer guide

1. Bias = a systematic error pushing estimates one way, for example choosing quadrats that look full (1). Variation = chance differences between random samples, for example two random sets of 10 squares giving different totals (1).
2. Total 12; mean 12 ÷ 6 = 2 per quadrat (1); density 2 ÷ 0.25 = 8 per m² (1); 8 × 250 = 2,000 (1); units stated (plants per m², plants) (1).
3. Any two (1 each): correlation is not causation; moisture or soil may also change with shade; only one transect / no replication; light readings may be unreliable. One test (1): repeat transects in other places, or an experiment that shades some marked patches and not others and follows moss cover.
4. Lincoln-Petersen 60 × 45 ÷ 9 = 300 (2: method 1, answer 1). Chapman 61 × 46 ÷ 10 − 1 = 280.6 − 1 = 279.6, about 280 (2: method 1, answer 1).
5. Any two (1 each): closed population (no births, deaths, migration between samples); marks not lost; marking does not affect survival or behaviour; marked individuals mix fully; equal chance of capture.
6. Site C: Σ n(n − 1) = 4 × 20 = 80 (1); N(N − 1) = 20 × 19 = 380 (1); D = 1 − 80 ÷ 380 = 0.79 (1). Site D: 17 × 16 = 272, other species 0, sum 272 (1); D = 1 − 272 ÷ 380 = 0.28 (1); correct rounding/working shown (1). Explanation (2): same richness (4 species) but C is perfectly even and D is dominated by one species, so two random individuals from D are usually the same species.
7. Two sites can have the same number of species but very different evenness (1); one dominant species with a few rare ones is less diverse in practice / more vulnerable (1). Also accept: richness depends heavily on sample size and effort.

Vocabulary

diversity, species richness, evenness, Simpson's index, dominance

Differentiation

- Support: a table with columns n, $n - 1$, $n(n - 1)$ already set up.
- Stretch: compute Σp^2 (with $p = n \div N$) for Sites A and B and compare with the $n(n - 1)$ form. Why are they close but not equal? (The $n(n - 1)$ form picks without replacement; the difference shrinks as N grows.)

⚠ Safety

None beyond normal classroom rules.

Teacher notes and misconceptions

- See the README note on index names: check the form your exam uses before students meet a different "Simpson's index" in a past paper.
- Students often think "more species" always means "more diverse". Sites A and B, and C and D, are built to challenge that.

Grade 11 Science — Rates of reaction: what makes chemistry faster or slower

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (an AI agent) on 2026-11-04. No teacher has checked it yet. Read it fully, adapt it to your class and local rules, and test any practical work yourself before using it.

Back to all units

Big idea

Some reactions are over in a flash and others take years. The rate of a reaction is how quickly reactants are used up or products are made, and it can be measured. Particles only react when they collide with enough energy (the activation energy), so anything that makes energetic collisions more frequent speeds a reaction up: higher concentration, higher temperature, more surface area, or a catalyst that offers a lower-energy route. These ideas are tested here with measured data, then used to explain real choices in industry, cars, kitchens and factory safety.

Outcomes

By the end of the unit, students can:

1. Measure the rate of a reaction by following a change over time (mass lost, gas made, or time for a solution to go cloudy), plot the results and explain why the rate is fastest at the start.
2. Use the disappearing-cross method to test how concentration affects rate, and use 1/time as a measure of rate.
3. Test how temperature affects rate, and explain the result using collision theory and activation energy, including the rough rule that rate increases by a factor of about 2 to 3 for every 10 °C rise.
4. Compare the rate for lumps and powder of the same mass, and explain the difference using surface area.
5. Show that a catalyst speeds up a reaction without being used up, including an enzyme (catalase) and what happens when the enzyme is boiled.
6. Use rate ideas to explain real examples: catalytic converters, the iron catalyst in the Haber process, and dust explosions.

Prior knowledge

- Particles in solids, liquids and gases; dissolving; mass is conserved (grades 5–8).
- Acids react with carbonates to make carbon dioxide; neutralisation; safe handling of acids (grade 8).
- Enzymes and respiration in living things (grade 7).
- Fair tests, repeats, medians, line graphs and gradients (grades 3–9; grade 9 trolley experiment).
- Word and symbol equations; moles (grade 10 chemistry, if taught; the mole calculation in lesson 1 is a stretch task).

Lessons (about 50 minutes each)

#	Lesson	Practical?
1	Measuring rate: marble chips and acid	Mass lost every 30 s on a balance; graph
2	Concentration: the disappearing cross	Sodium thiosulfate + dilute acid at four concentrations
3	Temperature, collisions and activation energy	Disappearing cross at 20, 30, 40 and 50 °C
4	Surface area and catalysts	Chips vs powder; hydrogen peroxide with manganese dioxide and potato
5	Rates in the real world + unit check	Case studies; written assessment

Materials (whole unit)

- Eye protection for everyone in every practical lesson.
- Lesson 1: top-pan balances (reading to 0.01 g); 100 ml conical flasks; cotton wool; marble chips (calcium carbonate), about 10 g per group; dilute hydrochloric acid, 1 mol/L; 50 ml measuring cylinders; stopwatches or phones.
- Lessons 2 and 3: sodium thiosulfate solutions at 40, 30, 20 and 10 g/L (made up by a technician); dilute hydrochloric acid, 1 mol/L; 100 ml conical flasks; paper with a bold black cross; 10 ml and 50 ml measuring cylinders; thermometers; a water bath or kettle-filled beakers (lesson 3, up to 50 °C only); stopwatches; a well-ventilated room.
- Lesson 4: large marble chips, small marble chips and calcium carbonate powder (10 g each per group); dilute hydrogen peroxide, about 3% (no stronger); manganese(IV) oxide (manganese dioxide) powder, about 0.5 g per group, handled with a spatula; raw potato, cut into 1 cm cubes and grated; one batch of boiled potato; gas syringes, or upturned measuring cylinders in water troughs; filter paper and funnels for recovering the catalyst.
- Lesson 5: case-study cards (given in lesson 5); student copies of the unit check.
- Student record sheets (tables are given in each lesson).

Assessment

- Ongoing: closing check questions at the end of each lesson (answers included).
- Lesson 1: the mass-loss table, graph and rate calculations are a practical skills task.
- Lesson 3: the conclusion explaining the temperature result with collision theory is a written-explanation task.
- Lesson 5: a 10-question unit check (20 marks) with an answer guide and marking notes. No pass mark is set; use it to decide what to reteach.

Sources

These are general references that a teacher can use to check facts. Links were checked to load on 2026-11-04.

- Wikipedia, "Reaction rate": https://en.wikipedia.org/wiki/Reaction_rate
- Wikipedia, "Collision theory": https://en.wikipedia.org/wiki/Collision_theory
- Wikipedia, "Activation energy": https://en.wikipedia.org/wiki/Activation_energy
- Wikipedia, "Arrhenius equation": https://en.wikipedia.org/wiki/Arrhenius_equation
- Wikipedia, "Catalysis": https://en.wikipedia.org/wiki/Catalysis
- Wikipedia, "Enzyme": https://en.wikipedia.org/wiki/Enzyme

- Wikipedia, "Catalase": https://en.wikipedia.org/wiki/Catalase
- Wikipedia, "Hydrogen peroxide": https://en.wikipedia.org/wiki/Hydrogen_peroxide
- Wikipedia, "Manganese dioxide": https://en.wikipedia.org/wiki/Manganese_dioxide
- Wikipedia, "Sodium thiosulfate": https://en.wikipedia.org/wiki/Sodium_thiosulfate
- Wikipedia, "Calcium carbonate": https://en.wikipedia.org/wiki/Calcium_carbonate
- Wikipedia, "Hydrochloric acid": https://en.wikipedia.org/wiki/Hydrochloric_acid
- Wikipedia, "Iodine clock reaction": https://en.wikipedia.org/wiki/Iodine_clock_reaction
- Wikipedia, "Catalytic converter": https://en.wikipedia.org/wiki/Catalytic_converter
- Wikipedia, "Haber process": https://en.wikipedia.org/wiki/Haber_process
- Wikipedia, "Dust explosion": https://en.wikipedia.org/wiki/Dust_explosion

Facts used from these pages include: the factors that affect rate (Reaction rate); that only collisions with the right energy and orientation succeed, and that higher concentration gives more collisions (Collision theory); that rate rises by a factor of about 2 to 3 for every 10 °C rise for common activation energies (Arrhenius equation), and that the ratio of rates 10 °C apart is usually on the order of 2 (Reaction rate); that catalysts are not consumed and remain unchanged, with manganese dioxide speeding up hydrogen peroxide decomposition (Catalysis); 2 H2O2 → 2 H2O + O2 and that even 3% hydrogen peroxide can be dangerous for the eye (Hydrogen peroxide); that one catalase molecule can convert millions of hydrogen peroxide molecules each second, and that human catalase works best near pH 7 (Catalase); that enzymes denature when heated (Enzyme); that dilute acid decomposes thiosulfate to sulfur, sulfur dioxide and water (Sodium thiosulfate); CaCO3 + 2 H+ → Ca2+ + CO2 + H2O (Calcium carbonate); that hydrochloric acid is corrosive (Hydrochloric acid); oxidation of carbon monoxide and unburned hydrocarbons in catalytic converters (Catalytic converter); the iron catalyst (Haber process); and the flour-dust explosion at the Washburn A Mill, Minnesota, on 2 May 1878 (Dust explosion).

Known gaps and cautions

- **All results tables are invented example data**, chosen to be realistic and internally consistent. Real classes will get different numbers; the point is the pattern and the reasoning.
- The disappearing-cross reaction gives off a little sulfur dioxide. Use small volumes, a well-ventilated room and prompt disposal, and follow your local chemical-safety guidance and technician's advice, especially for students with asthma.
- Using 1/time as "rate" is an approximation: it treats every run as reaching the same amount of cloudiness. Rate equations, orders of reaction and the full Arrhenius equation are left for later study.
- Collision theory is taught qualitatively. The energy-distribution graph in lesson 3 is a sketch, not a calculated curve.
- Equilibrium and Le Chatelier's principle (why the Haber process uses a compromise temperature) are mentioned only briefly in lesson 5.
- This unit has not been checked by a teacher or a chemistry technician. Concentrations and quantities should be checked against your school's practical guidance before use.

Lesson 1 — Measuring rate: marble chips and acid

Back to unit

Goal

Students follow one reaction over time by measuring the mass lost as carbon dioxide escapes, plot a graph, and explain why the reaction is fastest at the start and then slows to a stop.

Materials

- Per group: a top-pan balance reading to 0.01 g; a 100 ml conical flask; a loose plug of cotton wool; about 10 g of marble chips (calcium carbonate), more than enough to react with all the acid; 50 ml of dilute hydrochloric acid, 1 mol/L; a 50 ml measuring cylinder; a stopwatch.
- Eye protection for everyone. Paper towels for drips.

Steps

✎ Opening (5 min)

Ask: "Which is faster, a firework or rusting? How could you measure how fast a reaction is, not just say it?" Collect ideas. Steer towards: watch something change over time — a reactant being used up or a product being made.

Introduce the word **rate**: how much reactant is used up, or product made, per second.

✎ Main activity (30 min)

1. Write the reaction on the board: calcium carbonate + hydrochloric acid → calcium chloride + water + carbon dioxide. Symbol form for the reacting ions: CaCO3 + 2 H+ → Ca2+ + CO2 + H2O.
2. Ask: "If carbon dioxide gas escapes from an open flask, what happens to the reading on the balance?" (It goes down.)
3. Each group puts 50 ml of acid in the flask, places the flask and the cotton-wool plug together on the balance and zeroes it (or notes the reading).
4. Add the marble chips, put the cotton wool loosely in the neck (it lets gas out but stops acid spray escaping), and start the stopwatch.
5. Record the mass lost every 30 seconds for 5 minutes.

Example results (invented, but realistic):

Time (s)	0	30	60	90	120	150	180	210	240	270	300
Mass lost (g)	0.00	0.30	0.54	0.72	0.85	0.94	1.00	1.04	1.07	1.09	1.10

1. Plot mass lost (y-axis) against time (x-axis) and draw a smooth curve.

2. Work out the mean rate in three time windows:
3. 0–30 s: 0.30 g ÷ 30 s = **0.010 g/s**
4. 120–150 s: (0.94 − 0.85) g ÷ 30 s = 0.09 ÷ 30 = **0.003 g/s**
5. 270–300 s: (1.10 − 1.09) g ÷ 30 s = 0.01 ÷ 30 ≈ **0.0003 g/s**
6. Stretch (moles): 50 ml of 1 mol/L acid contains 0.050 mol of H+. The equation needs 2 H+ for every CO_2, so at most 0.025 mol of CO_2 can form. CO_2 has a molar mass of 44 g/mol, so the most mass that can be lost is 0.025 × 44 = **1.10 g**. The reaction stopped at 1.10 g because the acid ran out (the marble chips were in excess).

✓ Discussion questions (10 min)

1. **Where is the graph steepest, and what does that mean?** Example answer: at the start. The steeper the curve, the more mass is lost each second, so the reaction is fastest at the start.
2. **Why does the reaction slow down?** Example answer: the acid is being used up, so there are fewer acid particles to hit the marble, and fewer reactions happen each second.
3. **Why did it stop at 1.10 g, even though there was still marble left?** Example answer: all the acid had reacted; the acid was the limiting reactant.
4. **Why is the cotton wool loose, not a tight bung?** Example answer: the gas must escape for the mass to drop, and a sealed flask could build up pressure.

✓ Closing check (5 min)

1. A curve on a mass-lost graph becomes flat at 4 minutes. What does that tell you? Answer: the reaction has stopped (one reactant has run out).
2. A reaction makes 24 cm^3 of gas in the first 20 seconds. What is the mean rate? Answer: 24 ÷ 20 = 1.2 cm^3/s.
3. Give one other way to follow this reaction, apart from mass. Answer: collect the gas in a gas syringe or upturned measuring cylinder and measure its volume over time.

Vocabulary

rate of reaction, reactant, product, limiting reactant, in excess, mean rate, gradient

Differentiation

- **Support:** give a pre-drawn axes grid and the first three points plotted; students compare "steep" and "flat" parts in words.
- **Stretch:** draw a tangent at 60 s and estimate the rate at that instant from its gradient; do the stretch mole calculation at the end of the main activity.

⚠ Safety

- Eye protection throughout. Dilute hydrochloric acid at 1 mol/L is an irritant; stronger hydrochloric acid is corrosive. Wipe up spills and wash skin with water.
- Keep the flask on the balance pan and do not lean over the neck while it fizzes.

- Pour the used liquid away as directed by the technician; leftover marble chips can be rinsed and reused.

Teacher notes and misconceptions

- "The reaction stops because the marble runs out." Here it does not; the acid runs out. Show the leftover chips.
- "Rate means how much product you get in total." Rate is how fast; the total amount depends on how much reactant there was. Two reactions can make the same total at different rates (lesson 4 shows this).
- The balance reading may drift slightly while the flask is still warm or wet; tell students to read it at the moment each 30 s ends, not to wait for it to settle.

Lesson 2 — Concentration: the disappearing cross

Back to unit

Goal

Students carry out a fair test of how the concentration of sodium thiosulfate affects the rate of its reaction with dilute acid, use 1/time as a measure of rate, and explain the pattern with collision theory.

Materials

- Per group: a 100 ml conical flask; a sheet of white paper with a bold black cross drawn on it; sodium thiosulfate solutions at 40, 30, 20 and 10 g/L (50 ml of each per run, made up by a technician); dilute hydrochloric acid, 1 mol/L; a 50 ml and a 10 ml measuring cylinder; a stopwatch.
- Eye protection for everyone. A well-ventilated room.

Steps

✎ Opening (5 min)

Show the reaction once as a demonstration. Put the flask of thiosulfate on the cross, add the acid, swirl once and start the stopwatch. The liquid slowly turns cloudy and yellow-white until the cross can no longer be seen from above.

Explain: dilute acid makes thiosulfate break down into sulfur, sulfur dioxide and water. The sulfur forms as tiny solid specks, which is what makes the liquid cloudy. The time until the cross disappears is a measure of how fast the sulfur forms.

✎ Main activity (30 min)

1. Ask for a prediction: "If the thiosulfate is more concentrated, will the cross disappear sooner or later? Why?"
2. Agree what to keep the same: volume of thiosulfate (50 ml), volume and concentration of acid (5 ml of 1 mol/L), the same flask, the same cross, the same person looking down from the same height, room temperature.
3. For each concentration: put 50 ml of thiosulfate in the flask on the cross, add 5 ml of acid, swirl once, start timing, and stop when the cross is no longer visible. Do three runs and take the median.
4. Rinse the flask between runs straight away (see Safety).

Example results (invented, but realistic):

Thiosulfate (g/L)	Run 1 (s)	Run 2 (s)	Run 3 (s)	Median time (s)	Rate = 1000 ÷ time (1/s × 1000)
40	21	22	20	21	47.6
30	28	27	30	28	35.7
20	43	45	42	43	23.3
10	86	84	112	86	11.6

1. Plot rate (1000 ÷ time) against concentration. The points lie close to a straight line through the origin: rate ÷ concentration is 1.19, 1.19, 1.16 and 1.16.
2. Discuss the 112 s run at 10 g/L: it is far from the other two, so it is probably a mistake (for example the timer was stopped late or the person looked from a different angle). Using the median means one odd run does not drag the answer.

✓ Discussion questions (10 min)

1. **Why do we use 1 ÷ time as the rate?** Example answer: a shorter time means a faster reaction, so 1 ÷ time gets bigger as the reaction gets faster. Each run makes about the same amount of cloudiness before the cross vanishes.
2. **What does the graph show?** Example answer: doubling the concentration roughly doubles the rate (20 g/L gives 23.3, 40 g/L gives 47.6).
3. **Explain the result using particles.** Example answer: a more concentrated solution has more thiosulfate particles in the same volume, so they collide with acid particles more often, and there are more successful collisions each second.
4. **What is the weakest part of this method?** Example answer: deciding exactly when the cross disappears is a judgement, and different people see it at different times. Keeping the same observer helps.

✓ Closing check (5 min)

1. At 25 g/L, between which two measured times would you expect the cross to disappear? Answer: between 28 s (30 g/L) and 43 s (20 g/L).
2. Why must the volume of acid be kept the same? Answer: it is a control variable; changing it would also change how fast the reaction goes, so the test would not be fair.
3. Using collision theory, explain why the 10 g/L solution took longest. Answer: fewest thiosulfate particles per ml, so the fewest collisions with acid particles each second.

Vocabulary

concentration, independent variable, dependent variable, control variable, median, collision theory, successful collision

Differentiation

- **Support:** give the results table with medians filled in; students plot time (not 1 ÷ time) against concentration and describe the curve in words.
- **Stretch:** compare the line through the origin with the iodine clock reaction, another timed reaction in which more thiosulfate makes the blue colour appear later. Ask why.

⚠ Safety

- Eye protection throughout. Dilute hydrochloric acid is an irritant.
- The reaction gives off a little sulfur dioxide, which has a sharp smell and irritates the airways. Use only the small volumes given, keep the room well ventilated, do not lean over the flask to sniff it, and pour each finished mixture away promptly with plenty of water, or as your technician directs.
- Students with asthma may be more sensitive. Seat them near an open window or let them be the timer and recorder.
- Follow your local chemical-safety guidance and technician's advice.

Teacher notes and misconceptions

- "A faster reaction makes more product." The cross disappears at roughly the same amount of sulfur each time; the concentrated run just gets there sooner.
- "More concentrated means the particles move faster." The particles move at the same speed at the same temperature; there are just more of them in each ml, so collisions are more frequent.
- The sulfur sticks to glass as a yellow film; rinse flasks between runs or the cross starts to look faint before the reaction does anything.

Lesson 3 — Temperature, collisions and activation energy

Back to unit

Goal

Students test how temperature affects the rate of the thiosulfate reaction and explain the result using collision theory and activation energy, including why a 10 °C rise has a much bigger effect than students usually expect.

Materials

- As lesson 2, using only the 20 g/L sodium thiosulfate solution.
- Thermometers; a water bath, or beakers of warm water from a kettle mixed with cold water, set to about 30, 40 and 50 °C. No hotter than 50 °C.
- Eye protection for everyone. A well-ventilated room.

Steps

✎ Opening (5 min)

Ask: "Why do we keep milk in the fridge?" Collect ideas, then ask: "Is there something general about reactions going slower when it is cold?"

Recap collision theory from lesson 2: particles must collide to react. Then add the new idea: **not every collision works.** Particles must hit hard enough, with at least a minimum amount of energy called the **activation energy**, and in a suitable orientation. Collisions that lead to a reaction are called successful collisions.

✎ Main activity (30 min)

1. Predict: "If we warm the thiosulfate from 20 °C to 30 °C, will the time halve, change a little, or stay the same?"
2. For each temperature: warm 50 ml of the 20 g/L thiosulfate in the flask in the water bath, measure its temperature, stand it on the cross, add 5 ml of 1 mol/L acid (at room temperature), swirl once and time until the cross disappears. Measure the temperature again at the end and record the mean of the start and end temperatures.
3. The 20 °C run is the same as the 20 g/L result from lesson 2; it can be reused if the room was at about 20 °C.

Example results (invented, but realistic; median of three runs each):

Mean temperature (°C)	Median time (s)	Rate = 1000 ÷ time
20	43	23.3
30	22	45.5

Mean temperature (°C)	Median time (s)	Rate = 1000 ÷ time
40	12	83.3
50	7	142.9

1. Work out how the rate changes for each 10 °C step: 45.5 ÷ 23.3 ≈ 1.95; 83.3 ÷ 45.5 ≈ 1.83; 142.9 ÷ 83.3 ≈ 1.72. Each 10 °C rise roughly doubles the rate.
2. Compare with chemistry references: for many reactions the rate rises by a factor of about 2 to 3 for every 10 °C rise, and the ratio of rates 10 °C apart is usually on the order of 2. The class result fits that rough rule.
3. Note the limit of the data: 7 s is hard to time by hand, so the 50 °C result is the least reliable.

Explaining the result (sketch)

Draw a sketch (not to scale) of the spread of particle energies at a low and a higher temperature, with a vertical line marking the activation energy. At the higher temperature the curve is flatter and spreads to higher energies, so a bigger share of particles lies to the right of the line.

Two things happen when the temperature rises:

1. Particles move faster, so they collide a little more often.
2. More importantly, a much bigger fraction of collisions have at least the activation energy, so a much bigger fraction are successful.

The second effect is why a 10 °C rise can double the rate, even though the particles only move a little faster.

✓ Discussion questions (10 min)

1. **Why does the rate roughly double when the temperature only goes up a little in kelvin (from 293 K to 303 K)?** Example answer: the number of collisions only rises a little, but the share of collisions with enough energy to react rises a lot.
2. **Why do we record the mean of the start and end temperatures?** Example answer: the warm flask cools while we time it, and the cold acid cools it too, so the start temperature alone would be too high.
3. **Why is the 50 °C result the least trustworthy?** Example answer: 7 s is very short, so a reaction-time error of half a second is a large fraction of the result.
4. **Why do fridges slow down food going off?** Example answer: lower temperature means fewer collisions with enough energy, so the reactions that spoil food (including those in microbes) go more slowly.

✓ Closing check (5 min)

1. What is activation energy? Answer: the minimum energy colliding particles need for the collision to lead to a reaction.
2. A reaction takes 80 s at 25 °C. Using the "about 2 per 10 °C" rule, estimate the time at 35 °C. Answer: about 40 s.

3. Give two reasons a higher temperature increases the rate. Answer: particles collide more often, and a bigger fraction of collisions have at least the activation energy.

Vocabulary

activation energy, successful collision, energy distribution, kelvin, rule of thumb

Differentiation

- **Support:** give the sketch of the energy distribution already drawn; students shade the part above the activation energy for each temperature and compare the areas.
- **Stretch:** plot rate against temperature and describe the curve (it gets steeper). Ask whether the rule "about 2 per 10 °C" can hold for ever (no: at high temperatures other limits appear, and in living things enzymes denature, as lesson 4 shows).

⚠ Safety

- Everything in lesson 2 applies, including ventilation and prompt disposal because of sulfur dioxide. Warm solutions give off sulfur dioxide faster, so the 50 °C limit matters.
- Water no hotter than 50 °C. Teachers handle any kettle; students only use the water bath or pre-mixed warm water.
- Eye protection throughout.

Teacher notes and misconceptions

- "Heat gives the reaction energy, so the products have more energy." The point is collision energy, not that heat is stored in the products.
- "Higher temperature means more particles." The number of particles is the same; they move faster and more collisions are energetic enough.
- "Rate doubles every 10 °C exactly." It is a rough rule for many common reactions, not a law; real factors vary.

Lesson 4 — Surface area and catalysts

Back to unit

Goal

Students show that breaking a solid into smaller pieces speeds up its reaction without changing how much product it makes, and that a catalyst (manganese dioxide, or the enzyme catalase in potato) speeds up a reaction without being used up.

Materials

- **Part A, per group:** 10 g each of large marble chips (the same size as lesson 1), small marble chips and calcium carbonate powder; 3 × 50 ml of 1 mol/L hydrochloric acid; a 100 ml conical flask for the chips and a 250 ml conical flask for the powder (it froths); cotton wool; a balance; a stopwatch.
- **Part B, per group:** dilute hydrogen peroxide, about 3%, 25 ml per run; a gas syringe (or an upturned measuring cylinder in a trough of water) connected to a conical flask with a bung and delivery tube; about 0.5 g of manganese dioxide powder on a weighed filter paper; 5 g of raw potato in 1 cm cubes; 5 g of grated raw potato; 5 g of grated potato that has been boiled for 5 minutes and cooled (prepared by the technician); a funnel, filter paper and a warm place to dry the paper.
- Eye protection for everyone.

Steps

✎ Opening (5 min)

Hold up a sugar cube and a spoonful of granulated sugar. Ask: "Which dissolves faster in tea, and why?" (Grade 5 dissolving.) Then: "Would the same idea work for a reaction?"

Show a sheet of paper and the same sheet torn into eight pieces. Ask how much more edge and surface there is to touch. Introduce **surface area**: particles can only react where the solid touches the liquid, so more surface means more collisions each second.

✎ Main activity, part A: surface area (12 min)

Repeat the lesson 1 method with each size, recording the mass lost at 60 s and at the end.

Example results (invented, but realistic):

Solid (10 g)	Mass lost at 60 s (g)	Mass lost at end (g)
Large chips	0.54	1.10
Small chips	0.86	1.10
Powder	1.08	1.10

All three end at 1.10 g, because in every case the same 50 ml of acid is used up (lesson 1). Smaller pieces change how fast, not how much.

✎ Main activity, part B: catalysts (18 min)

Hydrogen peroxide slowly breaks down into water and oxygen: 2 H2O2 → 2 H2O + O2. On its own this is very slow. For each run, put 25 ml of peroxide in the flask, add the solid, put the bung in at once and record the volume of oxygen collected after 60 s.

Example results (invented, but realistic):

Added to 25 ml peroxide	Oxygen after 60 s (cm³)
Nothing	1
0.5 g manganese dioxide	52
5 g potato cubes	9
5 g grated potato	24
5 g grated boiled potato	0

Then filter off the manganese dioxide, rinse it, let the paper dry and weigh it again. Example: 0.50 g before, 0.49 g after; the small loss is powder stuck to the glass and paper.

✓ Discussion questions (10 min)

1. **Why did the powder react fastest even though it was the same mass?** Example answer: it has much more surface touching the acid, so more acid particles hit the solid each second.
2. **How do we know manganese dioxide is a catalyst and not a reactant?** Example answer: it speeds the reaction up a lot, but almost all of it is still there afterwards, unchanged. Catalysts are not used up and can be reused.
3. **Why does potato work at all?** Example answer: potato cells contain the enzyme catalase, a biological catalyst that breaks down hydrogen peroxide. One catalase molecule can break down millions of peroxide molecules each second.
4. **Why did grated potato beat cubes, and boiled potato do nothing?** Example answer: grating exposes more cells, so more enzyme meets the peroxide (surface area again). Boiling denatures the enzyme: its shape unfolds and it stops working.
5. **How does a catalyst work, in collision-theory terms?** Example answer: it gives the reaction a different route with a lower activation energy, so a bigger fraction of collisions are successful at the same temperature.

✓ Closing check (5 min)

1. 10 g of lumps and 10 g of powder react with the same acid until the acid runs out. Which makes more gas in total? Answer: neither; they make the same total, but the powder makes it faster.
2. Give two pieces of evidence that a substance is a catalyst. Answer: the reaction is much faster with it; its mass is (almost) unchanged at the end.

3. Why are enzymes in your body sometimes said to work best at "about pH 7 and body temperature"? Answer: outside their best conditions enzymes can lose their shape (denature) and work less well. For example, human catalase works best near pH 7.

Vocabulary

surface area, catalyst, enzyme, catalase, denature, alternative route, decomposition

Differentiation

- **Support:** give part B as a teacher demonstration with the gas syringe projected; students fill in the table and answer questions 2 and 4.
- **Stretch:** 25 ml of 3% hydrogen peroxide can give about 250 cm³ of oxygen in total (around ten times its own volume). Ask: what percentage had broken down after 60 s with manganese dioxide? (52 ÷ 250 ≈ 21%.)

⚠ Safety

- Eye protection throughout. Even 3% hydrogen peroxide can be dangerous in the eye, and it irritates skin. Do not use stronger peroxide for this lesson. Wash splashes off with plenty of water.
- Never seal the flask tightly without a delivery tube to a gas syringe or trough; oxygen must have somewhere to go.
- Handle manganese dioxide powder with a spatula, avoid making dust, and dispose of it as your technician directs.
- No large "elephant toothpaste" demonstrations; they use much stronger peroxide.
- Do not eat any potato used in the lesson.
- Dilute hydrochloric acid is an irritant (part A). The powder froths up quickly; use the larger flask.

Teacher notes and misconceptions

- "A catalyst makes more product." It only changes how fast; the total amount of oxygen is set by how much peroxide there is.
- "Catalysts are not involved in the reaction." They take part, but come out unchanged at the end.
- "Boiling kills the enzyme." Enzymes are not alive; boiling changes their shape so they no longer work (denaturing).
- The "nothing" run may give 0–2 cm³ just from the gas warming or the bung pushing air in; that is a useful point about measurement error.

Lesson 5 — Rates in the real world + unit check

Back to unit

Goal

Students use concentration, temperature, surface area and catalysts to explain real situations where people want reactions faster or slower, then complete the unit check.

Materials

- Four case-study cards (below), one set per group.
- Student copies of the unit check (10 questions, 20 marks).

Steps

✎ Opening (5 min)

Ask: "Name a reaction people want to speed up, and one they want to slow down." Examples: making ammonia for fertiliser or cleaning car exhaust (faster); food going off or a dust cloud catching fire (slower, or not at all).

✎ Main activity: case-study cards (20 min)

Groups read each card and answer: Which factor or factors are involved, and how would you explain them using collisions?

1. **Catalytic converters.** A car exhaust contains carbon monoxide and unburned fuel. In a catalytic converter, a ceramic honeycomb coated with metal catalysts (such as platinum and palladium) helps these react with oxygen to form carbon dioxide and water. "Three-way" converters also reduce oxides of nitrogen; Volvo first sold them on 1977 California-specification 240 cars. Factors: catalyst (lower activation energy route), large surface area (honeycomb), hot exhaust (temperature).
2. **The Haber process.** Ammonia for fertiliser is made by reacting nitrogen and hydrogen on the surface of a solid catalyst, usually iron. Many plants run at about 500 °C and 200 bar. The iron catalyst needs at least about 400 °C to be efficient. Factors: catalyst; temperature; high pressure (gas particles closer together, like higher concentration). Teacher note: lower temperatures would give more ammonia at equilibrium but too slowly, so the temperature is a compromise. Equilibrium is studied later.
3. **Dust explosions.** Flour, sugar, grain, cocoa and coffee can all burn explosively as a fine dust cloud. On 2 May 1878 a flour-dust explosion destroyed the Washburn A Mill in Minnesota, killing 14 workers there and four more in nearby buildings. Factor: surface area. A bag of flour burns slowly; the same flour spread through the air as dust has a huge surface touching oxygen, so it can burn almost all at once.
4. **Keeping food cool.** Fridges and freezers slow down the reactions that make food go off, including those in microbes. Factor: temperature. Fewer collisions with at least the

activation energy; using the "about 2 per 10 °C" rule, food at 5 °C spoils several times more slowly than at 25 °C, as a rough estimate.

Share answers as a class. Draw out that the same four factors explain every case.

✓ Unit check (25 min)

Students work alone. Mark out of 20. No pass mark is set; use the results to decide what to reteach.

1. What is meant by the "rate" of a reaction? Give one way to measure it. **(2 marks)**
2. A reaction gives these gas volumes:

Time (s)	**0**	**10**	**20**	**30**	**40**	**50**	**60**
Gas (cm³)	0	30	50	62	68	70	70

(a) Calculate the mean rate in the first 10 s. (b) When did the reaction stop? **(2 marks)** 3. In a disappearing-cross test, three runs at one concentration took 18 s, 19 s and 31 s. Which value would you report, and why? **(2 marks)** 4. Use collision theory to explain why a more concentrated acid reacts faster with magnesium ribbon. **(2 marks)** 5. What is activation energy? **(2 marks)** 6. A reaction takes 60 s at 20 °C. Using the rough rule that the rate about doubles for each 10 °C rise, estimate how long it takes at 40 °C. Show your working. **(2 marks)** 7. 10 g of marble lumps and 10 g of marble powder each react with 50 ml of the same acid, which runs out in both cases. Compare (a) how fast and (b) how much carbon dioxide each makes. **(2 marks)** 8. A student adds 1.00 g of a black powder to hydrogen peroxide. Bubbles of oxygen appear quickly. Afterwards she filters, dries and weighs the powder: 0.99 g. What does this suggest about the powder? Explain. **(2 marks)** 9. Raw grated potato makes hydrogen peroxide fizz, but boiled grated potato does not. Explain why. **(2 marks)** 10. A flour mill keeps its floors and machines free of dust. Use rates of reaction to explain why. **(2 marks)**

Answer guide and marking notes

1. How fast reactants are used up or products are formed (1); any valid method, e.g. mass lost over time, gas volume over time, time for a cross to disappear (1).
2. (a) 30 ÷ 10 = 3.0 cm³/s (1). (b) At 50 s, when the volume stops rising (1). Accept "between 40 and 50 s" only if the student explains the curve is still rising at 40 s.
3. 19 s, the median (1), because 31 s is far from the others and is probably a mistake, so it should not drag the result (1). Accept "the mean of 18 and 19" with the same reason.
4. More acid particles in the same volume (1), so more frequent collisions with the magnesium and more successful collisions per second (1). "Particles move faster" scores 0 for the second mark.
5. The minimum energy (1) that particles must have when they collide for the collision to lead to a reaction (1).
6. 20 °C → 30 °C: rate doubles, time halves to 30 s (1); 30 °C → 40 °C: time halves again to 15 s (1). Accept "about 15 s" with working.
7. (a) Powder reacts faster because it has a bigger surface area (1). (b) The same amount, because the same amount of acid is used up in each (1).
8. It is a catalyst (1): it sped up the reaction but its mass was almost unchanged, so it was not used up; the 0.01 g difference is powder lost in filtering (1).

9. Potato contains the enzyme catalase, which catalyses the breakdown of hydrogen peroxide (1). Boiling denatures the enzyme, so its shape changes and it no longer works (1). "Boiling kills the enzyme" scores 1 only if "changes shape" or "denatures" is also given.
10. Fine dust has a very large surface area (1), so a dust cloud can burn extremely fast, causing an explosion (1). Accept any reference to the Washburn A Mill or similar as supporting detail, not as a replacement for the explanation.

Vocabulary

catalytic converter, Haber process, dust explosion, compromise conditions, pressure

Differentiation

- **Support:** give each case-study card with the factor names listed underneath; students choose and explain one.
- **Stretch:** for the Haber card, research what "equilibrium" means and why a lower temperature would give more ammonia but more slowly.

⚠ Safety

- No practical work in this lesson. Do not attempt dust-explosion demonstrations in class.

Teacher notes and misconceptions

- "Catalytic converters remove all pollution." They change some harmful gases into less harmful ones; carbon dioxide is still produced.
- "Higher pressure only matters for gases because they get hotter." In this unit, higher pressure is treated as packing gas particles closer together, like a higher concentration.
- Students often write "more collisions" without "per second". Insist on the rate of collisions, not just the number.

Grade 12 science: the extended investigation (planning, uncertainty, reporting, peer review)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (an AI agent) for the K-12 curriculum drafts project. No teacher has reviewed or taught it. Check every fact, number and safety note before use.

Band: 9-12 (ages 17-18) · **Strand:** Inquiry (all strands) · **Length:** 5 lessons, then a multi-week independent investigation

Big idea

A scientific result is only as good as the way it was found and reported. Before collecting data, a scientist decides what to measure, how, and how the data will be analysed. While measuring, they estimate how far each number can be trusted. Afterwards they report enough for someone else to repeat the work, and they let other people check it. This unit practises each step on one shared experiment (a simple pendulum) so that students can then run their own extended investigation.

Outcomes

By the end of the five lessons, students can:

1. Turn a broad question into a testable one, naming the independent, dependent and control variables, and write a short plan (including the analysis) **before** collecting data.
2. Tell random error from systematic error, and precision from accuracy (trueness), using an example from their own measurements.
3. Calculate a mean and an uncertainty (half the range) from repeated readings, and explain why timing ten swings beats timing one.
4. Plot data, linearise a relationship (T^2 against L), find a gradient, and use it to calculate a quantity (g), stating an uncertainty.
5. Write a report in the IMRaD structure (Introduction, Methods, Results, Discussion) that another student could repeat.
6. Give and respond to a specific, kind, written peer review.

Prior knowledge

- Fair tests and variables (grades 3-8 in the science progression).
- Means, graphs and gradients; the grade 9 trolley unit's $a = 2d/t^2$ analysis (grade 9 forces and Newton's laws).
- Squares and square roots; rearranging a formula.

Lessons

1. From a question to a plan — testable questions, variables, a pilot run, and writing the plan and analysis down first.

2. Measurement and uncertainty — random vs systematic error, precision vs accuracy, reaction time, repeats, mean and half-range.
3. Analysing data honestly — T^2 against L, gradient, g, outliers, and correlation vs causation.
4. Writing the report — IMRaD, methods someone can repeat, uncertainties, limitations, and why replication matters.
5. Peer review — reviewing a report with a checklist, responding to reviewers, and launching the extended investigation.

Materials

- Per group of 2-3: clamp stand, boss and clamp (G-clamped or weighted to the bench), thin string (about 1.2 m), a small bob (50-100 g mass or a metal washer stack), metre rule, stopwatch or phone timer, protractor, graph paper or a spreadsheet.
- Lesson 5: printed or shared copies of each group's report, the review checklist, and coloured pens.

Assessment

- **Closing check (lesson 5):** 10 questions, 20 marks, with an answer key. It checks skills, not memorised facts. No pass mark is set; use it to decide what to reteach.
- **The extended investigation (after the unit):** each student (or pair) plans, carries out, writes up and peer-reviews their own investigation over several weeks. A suggested timeline and approval steps are in lesson 5. Assess the plan, the honesty of the uncertainty and limitations, the report's repeatability, and the response to review — not whether the result was "right" or exciting.

Sources

All facts were checked against these Wikipedia articles on 5 November 2026. Wikipedia is a starting point; a teacher should confirm against a textbook or primary source.

- Scientific method
- Hypothesis
- Dependent and independent variables
- Pilot experiment — "a small-scale preliminary study conducted to evaluate feasibility, duration, cost, adverse events, and improve upon the study design".
- Observational error — random errors "can be mitigated by repeated measurements"; systematic errors cannot.
- Accuracy and precision — precision describes random error; trueness describes systematic error (bias).
- Measurement uncertainty
- Significant figures
- Standard deviation
- Mental chronometry — simple human reaction times are "usually on the order of 200 ms".
- Pendulum — period $T = 2\pi\sqrt{(L/g)}$ for small swings; the period is nearly independent of amplitude (isochronism); Galileo studied pendulums from around 1602.
- Pendulum (mechanics)
- Gravity of Earth — standard gravity is 9.80665 m/s² by definition; surface gravity varies by around 0.7%, from about 9.780 m/s² at the Equator to about 9.832 m/s² at the poles.
- Outlier — "there is no rigid mathematical definition of what constitutes an outlier"; a measurement error may justify discarding one.

- Correlation does not imply causation — the ice cream and drowning example of a third (confounding) variable.
- IMRAD — Introduction, Methods, Results, and Discussion.
- Peer review
- Preregistration (science) — registering hypotheses, methods or analyses before a study is conducted; aims include distinguishing confirmatory from exploratory analysis.
- Replication crisis — the 2015 Reproducibility Project: Psychology redid 100 studies; of 97 original studies with significant effects, 36% replicated successfully.

Known gaps and cautions

- The pendulum data in lessons 2-3 are **made up to be realistic**, generated from $T = 2\pi\sqrt{(L/g)}$ with $g = 9.81$ m/s² plus small timing scatter. Real class data will be messier; that is the point.
- The uncertainty method (half the range) is deliberately simple. Some courses expect standard deviation or standard error; lesson 2 mentions standard deviation as an extension only.
- The extended investigation needs time the timetable may not have (the suggestion is about six weeks of part-time work). Shorten it to a two-week mini-investigation if needed.
- Investigations involving people (surveys, reaction tests on classmates), animals, microorganisms, heat, electricity above battery voltage, or chemicals beyond those in earlier units need explicit teacher approval and the school's own safety and ethics rules. This draft does not replace them.
- No human educator has reviewed this unit.

Lesson 1: From a question to a plan

Back to the unit

Goal

Students turn a broad question about a pendulum into a testable one, name the variables, run a short pilot, and write a one-page plan — including how they will analyse the data — **before** collecting any real data.

Materials

- Per group: clamp stand (G-clamped or weighted), string, small bob (50-100 g), metre rule, stopwatch or phone timer, protractor.
- A one-page plan template (headings below) on paper or in a shared document.

Steps

✎ Opening (5 min)

Swing a pendulum at the front. Ask: "What do you think decides how long one swing takes?" Collect ideas on the board without judging them (for example: length of string, mass of the bob, how far you pull it back, the type of string).

Point out that "what decides how long a swing takes?" is a good question but not yet a testable one. A testable question changes **one** thing and measures **one** thing.

✎ Main activity (35 min)

1. **Pick one variable (5 min).** Each group chooses one factor from the board. Most groups should choose length; one or two can choose mass or release angle, which gives a useful comparison in lesson 3.
2. **Name the variables (5 min).** For the length investigation:
3. Independent variable (what you change): length L, from the pivot to the **centre** of the bob.
4. Dependent variable (what you measure): the period T, the time for one complete swing, there and back.
5. Control variables (kept the same): mass of the bob, release angle (small, about 10°), the same string, the same timer.
6. **Write a hypothesis and a prediction (5 min).** A hypothesis is a proposed explanation that can be tested; a prediction says what you expect to measure if it is right. Example: "Longer pendulums swing more slowly, so if L increases from 0.20 m to 1.00 m, T will increase."
7. **Pilot run (10 min).** Groups set L to about 0.60 m and try timing **one** swing three times, then **ten** swings three times. They write down all six readings. Most groups notice that single-swing times jump around by a noticeable fraction of the swing, while ten-swing times are steadier relative to their size. A pilot is a small trial run to check

that the method works before the real data; this one usually changes the method to "time ten swings, divide by ten".

8. **Write the plan before the data (10 min).** On one page, under these headings:
9. Question
10. Variables (independent, dependent, controls, and how each control is kept the same)
11. Method (numbered steps someone else could follow)
12. Range and repeats (for example, five lengths from 0.20 m to 1.00 m, three repeats of ten swings each)
13. **Analysis, decided now:** what you will calculate and plot (for example, "mean of three repeats, T = mean ÷ 10, plot T against L, then T^2 against L")
14. **Rule for odd readings, decided now:** for example, "if one repeat differs from the other two by more than 0.5 s, recount and retake it; if we cannot retake it, report it and say whether we left it out"
15. Risks and how to control them

Scientists sometimes register a plan publicly before collecting data; this is called **preregistration**. Its purpose is to make it clear which analyses were planned and which were tried afterwards.

✓ Discussion questions (with example answers)

1. Why measure to the centre of the bob, not to the top of it? The swinging mass acts roughly at its centre, so that is the length that matters. Measuring to the top would make every length a little too short — a systematic error, the same in every reading (lesson 2).
2. What did the pilot change about your method? Usually: timing ten swings instead of one, because human start/stop errors are a smaller fraction of a longer time. Some groups also find they need a fixed mark to count swings from.
3. Why write the analysis down before collecting data? So you can't choose, after seeing the numbers, the graph or the rule that makes the result look best. It also shows a reader which conclusions were planned and which are new ideas to test later.
4. Is "mass doesn't matter" a hypothesis you can test? Yes: change the mass with length and angle fixed, and see whether T changes by more than the uncertainty. If it doesn't, you can say "no change was detected within our uncertainty", not "mass has no effect at all".

✓ Closing check (5 min, with answers)

1. In the length investigation, name the independent variable, the dependent variable and two control variables. (Length; period; any two of mass, release angle, string, timer.)
2. What is a pilot run for? (To test the method on a small scale and improve it before the real data.)
3. Give one thing a good plan decides before any data are collected. (Any of: the analysis, the number of repeats and range, the rule for odd readings.)

Vocabulary

testable question, independent variable, dependent variable, control variable, hypothesis, prediction, period, pilot run, preregistration

Differentiation

- **Support:** give a partly filled plan with the variables named, so students complete the method and analysis lines.
- **Stretch:** ask students to predict the shape of the T against L graph before measuring and record the prediction in their plan.

⚠ Safety

- Clamp or weight the stand so it cannot tip; keep the bob small (50-100 g).
- Keep faces out of the swing path; release from the side, don't throw.
- Keep floor space clear of bags; tie back long hair near the stand.

Teacher notes and misconceptions

- Many students expect a heavier bob to swing faster. Let the mass groups test it rather than telling them.
- "Period" is one full there-and-back swing. Some students count half-swings; agree the definition before the pilot.
- If students' first plans are vague, ask: "Could another group follow this method without asking you anything?"

Lesson 2: Measurement and uncertainty

Back to the unit

Goal

Students tell random error from systematic error and precision from accuracy, see why timing ten swings beats timing one, and calculate a mean and an uncertainty (half the range) from repeated readings.

Materials

- One demonstration pendulum at the front, length 0.60 m (pivot to centre of bob).
- Every student needs a stopwatch or phone timer.
- The worked data below, on a slide or handout.

Steps

✎ Opening (5 min)

Ask: "If ten of you time the same pendulum, will you all get the same number?" Take a show of hands, then test it.

✎ Main activity (35 min)

1. **Everyone times the same thing (10 min).** Start the front pendulum swinging from a small angle. Every student times ten swings at once, starting and stopping on the same count. Collect all the readings on the board. Then repeat with **one** swing.

If your class's numbers are hard to use, use this example set, ten students timing ten swings:

Student	A	B	C	D	E	F	G	H	I	J
Time for 10 swings (s)	15.3	15.6	15.5	15.8	15.4	15.6	15.2	15.7	15.5	15.6

And three students timing **one** swing: 1.3 s, 1.8 s, 1.5 s.

1. **Mean and uncertainty (10 min).** Work through the ten-swing set together:
2. Mean = 155.2 ÷ 10 = **15.52 s**.
3. Range = largest − smallest = 15.8 − 15.2 = **0.6 s**.
4. Uncertainty (half the range) = **±0.3 s**.
5. Report the mean to the same decimal place as the uncertainty: **15.5 ± 0.3 s** for ten swings.
6. Divide both by ten for one period: **T = 1.55 ± 0.03 s**.

Now the single-swing set: mean 1.53 s, half-range 0.25 s, about **16%** of the swing. For ten swings the uncertainty is 0.3 s out of 15.5 s, about **2%**. Ask students to explain the difference: human reaction times are about 0.2 s (simple reaction times are usually on the

order of 200 ms), and that start/stop error is about the same whether you time one swing or ten, so it is a much smaller fraction of a longer time.

1. **Random vs systematic (10 min).** Use two short scenarios:
2. Scenario 1: the ten students' readings scatter on both sides of the mean. Some react a little early, some a little late. This is **random error**: it varies from reading to reading, and repeating and averaging reduces its effect.

3. Scenario 2: one group measured every length to the **top** of a 4 cm bob instead of its centre, so every length is 2 cm too short. Repeating does not help; every reading is wrong the same way. This is **systematic error**. It is found by checking the method or the instrument, not by taking more readings.

4. **Precision vs accuracy (5 min).** Draw two targets on the board:

5. Tight cluster away from the centre: **precise but not accurate** (small random error, a systematic error).
6. Wide scatter around the centre: **accurate on average but not precise** (no systematic error, large random error). Precision describes random error. The closeness of the mean to the true value (called trueness in the ISO terms) describes systematic error. Good measurements need both.

✓ Discussion questions (with example answers)

1. Student G's 15.2 s is the lowest. Was G "wrong"? Not necessarily. All ten readings are within 0.3 s of the mean; G's is part of the normal scatter, so it stays in. A reading would only be suspicious if it were far outside the others (lesson 3).
2. Why not time 100 swings to make the uncertainty even smaller? It would shrink the reaction-time part further, but the swing slowly dies away, counting errors become likely, and it takes far longer. Ten to twenty swings is a sensible trade-off; a good report says why the number was chosen.
3. Would taking more readings fix the "top of the bob" error? No. It is systematic: more readings give a more precise wrong answer. Fix the method (measure to the centre) or correct each length by adding 2 cm.
4. Is ±0.3 s "the error" in the measurement? It is an estimate of how far the mean could reasonably be off because of scatter. It does not include systematic errors nobody has noticed, so it can be too small.

✓ Closing check (5 min, with answers)

1. Times for 10 swings: 12.6 s, 12.9 s, 12.7 s. Find the mean and the uncertainty (half the range). (Mean 38.2 ÷ 3 = 12.73 s ≈ 12.7 s; range 0.3 s; uncertainty ±0.15 s, so about 12.7 ± 0.2 s.)
2. Give one example of a systematic error in the pendulum experiment. (Measuring to the top of the bob; a stopwatch that runs fast; always starting the watch late for the same reason.)
3. Why does timing ten swings give a smaller percentage uncertainty than timing one? (The reaction-time error is about the same either way but is a smaller fraction of a longer time.)

Vocabulary

random error, systematic error, precision, accuracy, trueness, mean, range, uncertainty, reaction time, significant figures

Differentiation

- **Support:** give a table with columns for each reading, total, mean, largest, smallest and half-range.
- **Stretch:** calculate the standard deviation of the ten-swing set (about 0.18 s with a calculator or spreadsheet) and compare it with the half-range. Discuss why courses use different measures of spread.

⚠ Safety

- Only the teacher handles the front pendulum; students stay seated while timing.
- Keep the swing area clear.

Teacher notes and misconceptions

- Students often think an uncertainty means someone made a mistake. Stress that every measurement has one; stating it is honest, not an admission of failure.
- "Human error" is not an explanation in a report. Ask: which human action, and does it push readings randomly or always one way?
- Rounding: the closing check answer gives ±0.15 s, which many courses round to ±0.2 s. Accept either if the reasoning is clear.

Lesson 3: Analysing data honestly

Back to the unit

Goal

Students process repeated readings, deal with an odd reading using the rule they wrote in advance, linearise the pendulum relationship by plotting T^2 against L, find the gradient, calculate g with a rough uncertainty, and explain why a correlation alone does not show a cause.

Materials

- Groups' own data from their investigation, or the worked data below.
- Graph paper or a spreadsheet; calculators.

Steps

✎ Opening (5 min)

Show the formula for a simple pendulum swinging through small angles: **$T = 2\pi\sqrt{(L/g)}$**, where g is the gravitational field strength. Ask: "If this is true, what graph should give a straight line?" Squaring both sides gives $T^2 = (4\pi^2/g) \times L$, so **$T^2$ against L** should be a straight line through the origin with gradient $4\pi^2/g$.

✎ Main activity (35 min)

1. **Process the length data (10 min).** Worked example (times for 10 swings, three repeats each):

L (m)	Run 1 (s)	Run 2 (s)	Run 3 (s)	Mean (s)	± half-range (s)	T (s)	T^2 (s^2)
0.20	9.1	8.8	9.0	8.97	0.15	0.897	0.804
0.40	12.8	12.5	12.7	12.67	0.15	1.267	1.604
0.60	15.6	**14.0**	15.4	see below			
0.80	17.8	18.1	17.9	17.93	0.15	1.793	3.216
1.00	20.2	19.9	20.1	20.07	0.15	2.007	4.027

1. **The odd reading (8 min).** At 0.60 m, run 2 (14.0 s) is 1.4-1.6 s below the other two. The group's plan said: "if one repeat differs from the other two by more than 0.5 s, recount and retake it; if we cannot retake it, report it and say whether we left it out." Ask groups what might cause it. One check: nine swings would take about $0.9 \times 15.5 \approx 14.0$ s, so a miscount of nine swings as ten fits exactly.

The group could not retake the run, so, following their rule, they leave it out **and say so in the report**: - Mean of runs 1 and 3 = 15.50 s, half-range 0.10 s, T = 1.550 s, $T^2 = 2.403\ s^2$. - If they had kept it, the mean would be 15.0 s and $T^2 = 2.25\ s^2$, a point clearly below the line.

There is no rigid mathematical definition of an outlier; deciding is a judgement. That is why the rule is written before the data and every exclusion is reported with its reason. Leaving out a point **because** it spoils the result you hoped for is not allowed.

1. **Graph and gradient (10 min).** Plot T^2 (y-axis) against L (x-axis). The points lie close to a straight line through the origin. A best-fit line gives a gradient of about **4.03 s²/m** (a spreadsheet least-squares fit gives 4.029 with an intercept of −0.006 s², effectively zero).

Then $g = 4\pi^2 \div \text{gradient} = 39.48 \div 4.03 \approx$ **9.80 m/s²**.

1. **A rough uncertainty in g (7 min).** The largest percentage uncertainty in a ten-swing time is at 0.20 m: 0.15 ÷ 8.97 ≈ 1.7%. Squaring T doubles the percentage, about 3.3%, so g is uncertain by roughly 3% of 9.8, about ±0.3 m/s². Result: **g = 9.8 ± 0.3 m/s²**. The accepted value used in physics classrooms, 9.81 m/s², lies inside this range. (This is a rough, worst-point method; the stretch task uses steepest and shallowest lines.)

The mass and angle groups

Ask these groups to share their results. Example data at L = 0.60 m (ten swings, mean of three, each about ±0.2 s):

Mass (g)	**50**	**100**	**200**
Time for 10 swings (s)	15.5	15.6	15.5
Release angle	**10°**	**20°**	**30°**
Time for 10 swings (s)	15.6	15.7	15.8

The mass results show no change larger than the uncertainty. The angle results rise slightly, by about the size of the uncertainty. The full theory predicts that the period does depend a little on amplitude (about 1.7% longer at 30° than for a tiny swing), which is why the formula $T = 2\pi\sqrt{(L/g)}$ is called the small-angle approximation. A class experiment can just about see this, so a fair conclusion is "a small increase, close to our uncertainty", not "angle has no effect".

✓ Discussion questions (with example answers)

1. Why plot T^2 against L instead of T against L? T against L is a curve, and it is hard to tell by eye whether a curve matches a formula. A straight line is easy to judge, and its gradient gives g directly.
2. Was the group right to leave out 14.0 s? Yes, because they used a rule written in advance, found a likely physical cause (a miscounted swing), and reported it. They should also show what difference keeping it would make.
3. The mass group found "no effect". What exactly may they claim? That no change larger than about 0.2 s in ten swings was detected for masses from 50 to 200 g. They cannot claim mass has no effect at all, or outside the range they tested.
4. A survey finds that towns with more ice-cream sales have more drownings. Does ice cream cause drowning? No. Hot weather increases both (a third, confounding variable). In the pendulum experiment we changed L ourselves and kept the rest fixed, which is why we can say length affects the period. Data that are only observed, not controlled, need much more care before claiming a cause.

✓ Closing check (5 min, with answers)

1. Repeats of 11.2 s, 11.4 s and 12.9 s. The plan's rule is "more than 0.5 s from the other two → retake or report". What should the student do? (Retake the 12.9 s run; if that's impossible, report it and its likely cause and state whether it was left out.)
2. A gradient of T^2 against L is 4.10 s^2/m. Calculate g. (39.48 ÷ 4.10 ≈ 9.63 m/s^2.)
3. Name the third variable in the ice-cream example and say what it does. (Hot weather/ temperature; it increases both ice-cream sales and swimming, and so drownings.)

Vocabulary

linearise, gradient, best-fit line, intercept, outlier, exclusion rule, small-angle approximation, correlation, causation, confounding variable

Differentiation

- **Support:** provide axes already scaled and the processed table; students plot and read the gradient.
- **Stretch:** draw the steepest and shallowest lines that still pass through the error bars, find g from each, and use half their difference as the uncertainty. Compare with the ±0.3 m/s^2 estimate.

⚠ Safety

- No practical work in this lesson beyond any remaining data collection; follow lesson 1's precautions if pendulums are used.

Teacher notes and misconceptions

- Students often think a "good" result means matching 9.81 exactly. Praise an honest uncertainty that includes the accepted value, and an honest discussion when it doesn't.
- Some students discard every inconvenient point. Ask them to show the rule they wrote in lesson 1 and to report each exclusion.
- g varies with location by around 0.7% over Earth's surface (about 9.780 m/s^2 at the Equator to about 9.832 m/s^2 at the poles at sea level); 9.81 m/s^2 is a rounded classroom value of standard gravity (9.80665 m/s^2). Don't treat a result of 9.79 or 9.83 as wrong.

Lesson 4: Writing the report

Back to the unit

Goal

Students write up the pendulum investigation in the IMRaD structure (Introduction, Methods, Results, Discussion), with methods another group could repeat, results with uncertainties, and an honest discussion of limitations. They learn why repeatable reports matter to science as a whole.

Materials

- Each group's plan (lesson 1), data and graph (lessons 2-3).
- The "weak report" extract below, printed or on a slide.
- A report template with the headings below.

Steps

✎ Opening (5 min)

Tell students: in 2015, a project called the Reproducibility Project: Psychology redid 100 published psychology studies. Of 97 original studies that had reported significant effects, only 36% replicated successfully, and the effects found were on average about half the original size. Ask: "What would you need from a report to be able to repeat it?" Collect answers: exact method, equipment, numbers of repeats, raw data, how the data were analysed, what was left out and why.

Make clear that this does not mean those scientists were dishonest or that psychology is uniquely unreliable. It shows that repeating work is how science checks itself, and that clear reports make repeating possible.

✎ Main activity (35 min)

1. **Fix a weak report (10 min).** Groups improve this extract, listing every problem they find:

   > We did the pendulum experiment. We changed the length and timed it. The results are in the graph. Longer ones were slower. Our answer for g was 9.8 which is basically right, so it worked. There was some human error.

Problems to find (example answers): no question or hypothesis; method too vague to repeat (which lengths? measured to where? how many swings and repeats?); no table or units; "slower" not quantified; no uncertainty on g; "basically right" is not a comparison; "it worked" judges by the answer, not the method; "human error" names no specific error, so it can't be fixed; nothing about the excluded reading.

1. **Write the report (25 min).** Each student writes their own report, using their group's data. Headings and what goes under each:

2. **Title:** says what was measured, e.g. "How the length of a simple pendulum affects its period, and an estimate of g".
3. **Abstract (3-4 sentences, written last):** the question, the method in one line, the main result with its uncertainty, and the main conclusion.
4. **Introduction:** the question, why it matters, the formula $T = 2\pi\sqrt{(L/g)}$, and the hypothesis and prediction from the plan. Cite any source used.
5. **Methods:** equipment and numbered steps in enough detail for another group to repeat the work: how L was measured (pivot to centre of bob), release angle, number of swings timed, number of repeats, the rule for odd readings. Say what changed after the pilot and why.
6. **Results:** a table of raw readings with units, means and uncertainties; the T^2 against L graph with a best-fit line; the gradient and the calculation of g. Report every excluded reading and the reason for it. No interpretation here, just what was found.
7. **Discussion:** compare the result with the prediction and with the accepted value, using the uncertainty (does 9.81 m/s^2 lie within 9.8 ± 0.3 m/s^2?). Name specific random and systematic errors and which way each would push the result. Say what you would change next time. Separate planned conclusions from new ideas ("the angle data suggest a small effect; a planned test with more angles would check this").
8. **References:** every source used, in a consistent format.

✓ Discussion questions (with example answers)

1. Why write the abstract last? It summarises results and conclusions, which you only know at the end.
2. What goes in Results and what goes in Discussion? Results: what was measured and calculated (tables, graphs, numbers with uncertainties). Discussion: what it means, how far it can be trusted, and what to do next.
3. Your g came out as 9.5 ± 0.2 m/s^2, so 9.81 is outside your range. Should you change your data or leave out points until it fits? No. Report it honestly and look for a systematic error that would explain it (for example, lengths measured to the top of the bob make every L too short; work out which way that pushes g). A report that explains a mismatch well is better science than one that hides it.
4. Why report the excluded 14.0 s reading at all? So a reader can judge the decision, and repeat the analysis with or without it.

✓ Closing check (5 min, with answers)

1. What do the letters IMRaD stand for? (Introduction, Methods, Results, and Discussion.)
2. Give two details that must be in the Methods section for the pendulum. (Any two of: how L was measured, number of swings timed, number of repeats, release angle, bob mass, the rule for odd readings.)
3. Rewrite "there was some human error" as a useful sentence. (Example: "Starting and stopping the stopwatch by hand adds a random error of a few tenths of a second; timing ten swings reduced its effect on T to about 2%.")

Vocabulary

IMRaD, abstract, methods, results, discussion, limitation, reproducibility, replication, reference

Differentiation

- **Support:** provide sentence starters for each section ("We measured … by …", "Our value of g, … ± … m/s², is within/outside …").
- **Stretch:** read the Methods section of a short published school-level investigation or a science-fair report and identify one detail you would need to repeat it that is missing.

⚠ Safety

- No practical work in this lesson.

Teacher notes and misconceptions

- Students often treat the accepted value as the goal. Mark the honesty and quality of the uncertainty and discussion, not closeness to 9.81 m/s².
- Avoid presenting the replication figures as "most science is wrong". The figure is about one project in one field; the lesson is that checking and clear reporting matter everywhere.
- Some students copy each other's reports because the data are shared. Shared data are fine; the writing, graph and discussion should be each student's own.

Lesson 5: Peer review

Back to the unit

Goal

Students review another student's pendulum report using a checklist, write specific and kind comments, respond to the review of their own report, and take the closing check. The lesson ends by launching the extended independent investigation.

Materials

- Each student's report from lesson 4, with names replaced by a number.
- The review checklist below, printed.
- The closing check (10 questions, 20 marks).
- The extended investigation timeline and topic list below.

Steps

✎ Opening (5 min)

Explain that before most scientific papers are published, other experts in the field read them and recommend changes or rejection. This is **peer review**, and in academic publishing the reviewers are usually anonymous. Peer review catches many problems, but not all: reviewers usually see only the report, not the lab, which is why clear methods and repeating work still matter (lesson 4).

Today's reviews use numbers, not names, so that comments are about the report rather than the person.

✎ Main activity (25 min)

1. **Review (15 min).** Each student gets one report and fills in the checklist:

Question	Yes / partly / no	Where in the report? Comment
Could I repeat the method from this report alone?		
Are units and uncertainties given for every result?		
Is every excluded reading reported, with a reason?		
Does the graph match the table?		
Is the calculation of g correct? (check one step yourself)		
Does the discussion compare the result with the accepted value **using the uncertainty**?		
Are specific errors named, with the direction each would push the result?		
Are sources referenced?		

Then write a short review: **one thing done well; up to three most important changes, each specific** (say where, what, and why); and any small corrections.

Model the difference: - Not useful: "Your method is bad." - Useful: "Methods, step 2: you don't say where L was measured to. If it was the top of the bob, every L is short by the bob's radius, which would make g too small. Please state it."

1. **Respond (10 min).** Students read the review of their own report and write a short response, one line per comment: what they changed, or why they disagree. Disagreeing politely with a reason is acceptable; ignoring a comment is not.

✓ Closing check (15 min, 10 questions, 20 marks)

Answers and mark guidance follow each question. Two marks each.

1. A student asks: "Does the temperature of water affect how fast sugar dissolves?" Name the independent variable, the dependent variable and two control variables. Answer: independent: water temperature; dependent: time to dissolve (or mass dissolved in a set time); controls: any two of mass of sugar, volume of water, stirring, sugar grain size. 1 mark for IV and DV both correct, 1 mark for two valid controls.
2. What is a pilot run for? Give one change a pilot might lead to. Answer: a small trial to test the method before real data (1); e.g. timing ten swings instead of one, changing the range, adding a marker to count from (1).
3. Times for ten swings: 24.6 s, 24.9 s, 24.3 s. Find the mean time, its uncertainty (half the range), and the period T with its uncertainty. Answer: mean 24.6 ± 0.3 s (1); T = 2.46 ± 0.03 s (1).
4. Classify each as a random or systematic error: (a) a thermometer that always reads 2 °C too high; (b) stopwatch readings that scatter above and below the mean because of reaction time. Answer: (a) systematic (1); (b) random (1).
5. What does "precise but not accurate" mean? Give an example from the pendulum experiment. Answer: readings close to each other but all away from the true value (1); e.g. every length measured to the top of the bob, giving consistent repeats but a g that is too small (1).
6. A graph of T^2 against L has a gradient of 3.98 s^2/m. Calculate g, showing the formula you used. Answer: $g = 4\pi^2 \div$ gradient (1) $= 39.48 \div 3.98 \approx 9.92$ m/s^2 (1).
7. Ten-swing repeats are 30.1 s, 30.3 s and 27.2 s. The plan's rule is "more than 0.5 s from the other two → retake, or report and explain". What should the student do, and what is a likely cause? Answer: retake it, or if that's impossible exclude it and report it with the reason (1); a miscount of nine swings as ten, since $0.9 \times 30.2 \approx 27.2$ s (1).
8. A survey finds students who sleep more get higher test marks. Give one possible third (confounding) variable, and one way to test whether sleep itself makes a difference. Answer: any reasonable confounder, e.g. less screen time late at night, health, fewer after-school jobs (1); a described design, not one to run in class: either a controlled comparison where sleep is changed and other factors are kept as similar as possible, with appropriate ethics approval, or an observational comparison that also records the confounder and compares students who are similar on it (1). Accept either.
9. Which IMRaD section should contain (a) the table of raw readings, (b) an explanation of why your g came out lower than expected? Answer: (a) Results (1); (b) Discussion (1).
10. Rewrite this review comment so it is specific and useful: "Your graph is wrong." Answer: any comment that says where, what and why, e.g. "On the graph, the point at L = 0.60

m is plotted at 2.25 s², but the table gives 2.40 s². Please check which is right." 1 mark for a specific location/problem, 1 for a reason or suggested fix.

No pass mark is set. Use the results to decide what to reteach before the extended investigation.

✎ Launching the extended investigation (5 min, then several weeks)

Suggested timeline (about six weeks of part-time work; shorten to two weeks if needed):

Week	Student does	Teacher checks before the next step
1	Chooses a question; writes a one-page plan (lesson 1 headings), including the analysis and the rule for odd readings, and a risk assessment	**Approves plan and risk assessment** before any data are collected
2	Pilot run; revises plan	Revised plan
3-4	Collects data; keeps a dated lab notebook with all raw readings	Notebook spot-check
5	Drafts IMRaD report	Draft submitted
6	Peer review in pairs; writes response to review; submits final report and response	Final mark

Example questions, chosen because they need only equipment from earlier units and are low risk:

- How does drop height affect the bounce height of a ball? (physics; links to grade 9 forces)
- How does the number of layers of insulation affect how fast a cup of warm water cools? (use warm tap water, not boiling)
- How does light intensity affect the rate at which leaf discs float? (links to grade 7 photosynthesis)
- How does surface area or concentration affect a reaction rate, using only the reactions and concentrations in grade 11 rates of reaction?
- How does the density of a plant species change along a transect from a path? (links to grade 10 ecology)
- How does the amount of salt in water affect the germination of cress seeds?

Vocabulary

peer review, reviewer, response to reviewers, anonymous review, lab notebook, risk assessment

Differentiation

- **Support:** reviewers answer only the first four checklist rows; authors respond to the two most important comments.
- **Stretch:** reviewers check the g calculation from the raw data themselves and say whether they get the same answer.

⚠ Safety

- No practical work this lesson.
- For the extended investigation: no data collection before the teacher approves the plan and risk assessment. Investigations involving other people (surveys, reaction-time tests), animals, microorganisms, mains electricity, heating beyond warm tap water, or chemicals not used in earlier units need explicit teacher approval under the school's own safety and ethics rules.

Teacher notes and misconceptions

- Some students write only praise, others only criticism. Require one strength and specific changes.
- Students may treat a reviewer's comment as an order. Say clearly that authors may disagree with a reason; reviewers can be wrong too.
- Anonymity is easy to break in a small class. Its point here is to keep comments about the work; remind students that kindness rules still apply.

Proposed K–12 History, Geography and Society Progression (Draft Framework)

Status: written framework (not lessons); unreviewed AI draft; CC0 1.0
Author: Claude Opus 5.5 (progression only; each written unit names its own author below)
Back to index: Repository home | Proposed K–12 framework

> **Important:** this maps a proposed sequence of skills and themes. A grade listed here is **not** a written unit unless it is marked **Unit written** with a link. It is not aligned to any official standard. History and civics content differs between countries, so this progression names skills and kinds of study, not a national story. A teacher should choose the local, national and world content and check it against their own requirements.

Principles

1. **Skills travel; content is local.** Reading a source, building a timeline, using a map and weighing a claim work in any country. Which wars, rulers, rivers or laws are studied is a local decision, so this document names the kind of study ("a local history study", "an early society from a different continent") rather than a fixed topic.
2. **Near and far from the start.** Younger students start with their own day, school and neighbourhood, but every band also compares with a place or time far away, so "normal" is never just "ours".
3. **Evidence before story.** Students meet traces of the past (objects, photos, letters, records) and ask what they can and cannot tell before they are given a finished account. History education professor Peter Seixas calls these "traces" and "accounts".
4. **Understand before judging.** Students try to explain why people in the past acted as they did, using those people's beliefs and circumstances, before they judge those actions by today's values. Understanding is not approving.
5. **Maps are models.** Every map leaves things out and every world map distorts something. For example, the Mercator projection makes Greenland look far larger than it really is compared with lands near the equator.
6. **Calibrated conclusions.** Students say "supported", "contradicted" or "not enough evidence", and name what new evidence could change their mind.
7. **Care with sensitive topics.** Family history, migration, religion, conflict and injustice can be personal. No student should have to share private family details; teachers plan these topics with local guidance and tell families what is coming.

Strands

Strand	Short name
Time, change and causes (history)	Time
Place, space and environment (geography)	Place
People, rules and decisions (civics and society)	Rules
Resources, work and choices (economics)	Choices

Strand	Short name
Sources and evidence (questions, sources, corroboration, argument)	Inquiry (runs through every unit)

The Time and Inquiry strands draw on Seixas's six historical thinking concepts: historical significance, primary sources as evidence, continuity and change, cause and consequence, historical perspectives, and the moral dimension of history.

Band overview

Band	Ages	Focus	Typical evidence
K-2	5-8	Before and after; here and there; why we have rules	Objects, photos, picture maps, walks
3-5	8-11	Local study with real sources; maps with grids and scale; first trade-offs	Old maps, local records, simple data tables
6-8	11-14	Societies as systems; cause and consequence; checking information	Archaeology, document sets, projections, news
9-12	14-18	Modern world; competing accounts; how institutions work; independent investigation	Archives, statistics, multiple historians' accounts

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Grade by grade

K-2: noticing and comparing

- **Kindergarten — My day and my class.** Time: first/next/last, yesterday/today/tomorrow, a picture sequence of the school day. Place: a simple model and picture map of the classroom. Rules: making class rules together and saying why each one exists. Choices: needs and wants.
- **My day and my class — Unit written:** units/society/K-my-day-and-my-class/ (by GLM-5.3 Flash). Sequencing the school day, a block model and picture map of the classroom, class roles and jobs, making one class rule with a "so that" reason, and needs and wants. No reading assumed; nothing about family or home life.
- **Families, then and now, and people who help us (term 2) — Unit written:** units/society/K-families-then-and-now-helpers/ (by Claude Opus 5.5). Kinds of families and homes using made-up picture cards (no child is asked about their own family), old and new objects, old photos as sources and a three-card timeline, and people who help at school and nearby.
- **Near and far, our school walk and a picture map (term 3) — Unit written:** units/society/K-near-far-and-our-school-map/ (by Claude Opus 5.5). Position words (near, far, next to, in front of, behind) on a play-mat town and in the classroom, a walk inside the school grounds, made by people or natural, and picture maps of a made-up school and our own school.
- **Grade 1 — Then and now.** Time: handling old and new versions of everyday objects (a key, a phone, a toy) and sorting them; a picture timeline. A conversation with an older person only where families agree. Place: a walk around the school and a route map. Choices: the jobs people do.
- **Rules, fairness and community jobs (term 1) — Unit written:** units/society/1-rules-fairness-and-community-jobs/ (by Claude Opus 5.5). Rules in different places with "so that..." reasons, three everyday kinds of fair (equal shares, taking turns, giving what

someone needs), changing a rule that isn't working, and jobs in a made-up town sorted into goods and services, with the tools and skills each needs. Grade 2 builds on goods and services with swapping and buying.

- **Then and now: timelines and old and new objects (term 2) — Unit written:** units/society/1-then-and-now-timelines-and-objects/ (by Claude Opus 5.5). Timelines of a school day and a made-up child growing up, a made-up classroom long ago and now (what changed and what stayed the same), old and new phones, music players, keys and toys on a three-part timeline, museum labels as sources (who made it, where, about when) and questions, and a made-up older person's memories (or an agreed visitor) feeding a class timeline of the made-up town of Little Hill.
- **Maps with a key, and land and water on a globe (term 3) — Unit written:** units/society/1-maps-keys-and-globes/ (by Claude Opus 5.5). Looking at objects from above and drawing them, symbols and a key on a map of the made-up town of Little Hill, finding and counting things with the key and saying where they are with next to, near, between and across (not left and right), groups making a map of a classroom corner with a key, and land and water on a globe and a flat world map. No compass directions, grid references or place names yet.
- **Grade 2 — Our community and a faraway one.** Place: landmarks and services in the local area compared with one contrasting place elsewhere in the world. Rules: rules at school and laws in the community. Choices: goods and services; swapping and buying. Inquiry: a first photo source — "What can we tell? What can't we tell?"
- **People, jobs and choices (term 1) — Unit written:** units/society/2-people-jobs-and-choices/ (by Claude Opus 5.5). Everyone plays a part in a community, goods and services and the skills behind them, made-up prices, and choosing when there is not enough.
- **How letters changed: sources, the first stamps and the people who changed them (term 2) — Unit written:** units/society/2-how-letters-changed-stamps-and-sources/ (by Claude Opus 5.5). Ways of sending a message then and now, made-up sources with maker, place and date, the real 1840 change to prepaid stamps in the United Kingdom, the people and groups behind it, and two accounts of one event.
- **Places near and far: weather, land and a parcel's journey (term 3) — Unit written:** units/society/2-places-near-and-far/ (by Claude Opus 5.5). Three made-up places (a town, a mountain village and a city by the sea), how weather and land shape clothes, homes and work, needs met from near and far, a parcel followed on a floor map with a key, and why goods, people and ideas move.

3-5: first real sources and maps

- **Grade 3 — Maps and the local area.**
- **Maps, routes and places — Unit written:** units/society/3-maps-routes-and-places/. Maps as models, symbols and legends, direction and grid references, scale and route choice, then making and testing a map.
- **Then and now from sources (term 2) — Unit written:** units/society/3-then-and-now-from-sources/ (by Claude Opus 5.5). A timeline with years and a scale for the made-up town of Little Hill, what happened in town and on the farms at the same time (electric street lamps in 1926, farms in 1948), daily life for a made-up child in 1926 and one now, six made-up sources of five kinds and what each can and cannot tell, two sources about the same evening compared, and questions about people and groups who shaped the change.
- **Rules, laws and who makes them (term 3) — Unit written:** units/society/3-rules-laws-and-who-makes-them/ (by Claude Opus 5.5). What rules are for and who made them, a rule and a law, decisions at four levels (class, school, the made-up town of Little Hill and a country) and ways of deciding, a made-up town problem on Pond Lane and the six steps of

changing a rule, benefits and costs of a choice, and a class meeting where children speak for made-up characters and send advice to Mayor Hen.
- Also: how the local area has changed, using old and new photos or maps.
- **Grade 4 — A local history study and our region.** Time: one question about the local past answered with real sources (old maps, records, photos, a local museum). Place: physical and human features of the home region; why settlements grew where they did (water, farmland, transport). Choices: scarce resources and who uses them.
- **Grade 5 — Movement, trade and decisions.** Time: one teacher-chosen case of migration or a trade route; a scaled timeline including BCE/CE. Place: routes on a world map. Rules: ways groups decide (voting, consensus, a leader deciding) and their trade-offs. Choices: a simple class budget and opportunity cost.

6-8: systems, causes and evidence

- **Grade 6 — Early societies.** Time: one or more early societies, ideally from more than one continent; archaeology as evidence and what it cannot tell us. Place: comparing world map projections and what each distorts. Inquiry: primary, secondary and tertiary sources.
- **Grade 7 — Connections and change.** Time: a period of contact between regions (for example trade, empire or the spread of ideas), studied for continuity and change and for causes and consequences. Perspectives from more than one side of the contact. Choices: markets, prices and supply and demand.
- **Grade 8 — Checking information; how government works.**
- **Checking information — Unit written:** units/society/8-information-literacy/. Claim, evidence and inference; following information back to its source; dates and context; independent corroboration; a conclusion that could change. It pairs well with professional fact-checkers' "lateral reading" (checking many other sources about a claim instead of reading one deeply).
- Also: the structure of local and national government, rights and responsibilities.

9-12: models, accounts and choices

- **Grade 9 — Industrial and modern change.** Time: a teacher-chosen study of industrialisation and its effects; what makes an event historically significant, and to whom. Place: urbanisation and human impact on environments, using real data.
- **Grade 10 — Conflict and cooperation.** Time: a twentieth-century conflict and a case of international cooperation; comparing two historians' accounts of the same event and explaining why they differ. Teachers plan this with care for students with family connections to the events.
- **Grade 11 — Institutions and economics.** Rules: how a law is made locally or nationally, courts and appeals, public budgets. Choices: interest, inflation and personal finance (linking with the mathematics progression); development indicators and their uncertainty.
- **Institutions and economics — Unit written:** units/society/11-institutions-and-economics/ (by DeepSeek-V4-Pro). Law-making in the UK and US, courts and appeals, public budgets, interest and inflation, and development indicators (GDP per capita, HDI, Gini) using two fictional countries.
- **Grade 12 — Independent investigation.** Students pose their own historical, geographical or civic question, gather sources, write an argued answer with honest uncertainty and go through peer review. This mirrors the science extended investigation unit. An optional civic project (for example a written proposal to a local body) is teacher-mediated and voluntary.

Links to other subjects

- **Language and literacy:** the grade 4 evidence and inference unit teaches the same move as grade 4 local history: say what a text shows, and what it cannot.
- **Science:** science grade 10 (ecology field sampling) and society grade 9 (urbanisation) both use real environmental data; grade 12 investigations share a planning and reporting method.
- **Mathematics:** scale (grade 3), timelines with negative years (grade 5), percentages and interest (grade 11).

Known gaps and cautions

- Fourteen society units are written so far: kindergarten term 1 (by GLM-5.3 Flash), kindergarten terms 2 and 3, grade 1 terms 1, 2 and 3, grade 2 terms 1, 2 and 3 and grade 3 terms 2 and 3 (by Claude Opus 5.5), grade 3 term 1 and grade 8 (by GPT-5.6 Sol) and grade 11 (by DeepSeek-V4-Pro). Everything else here is an outline.
- Grade placement is judgement, not research. Many countries teach these themes in a different order.
- The progression deliberately names no national story. Choosing it, and representing contested history fairly, needs local educators.
- No human educator has reviewed this progression.

Sources

- Wikipedia, "Historical thinking" (Peter Seixas's six historical thinking concepts; "traces" and "accounts"): https://en.wikipedia.org/wiki/Historical_thinking
- Wikipedia, "Primary source": https://en.wikipedia.org/wiki/Primary_source
- Wikipedia, "Mercator projection" (1569; size distortion away from the equator): https://en.wikipedia.org/wiki/Mercator_projection
- Wikipedia, "Fact-checking" (lateral reading): https://en.wikipedia.org/wiki/Fact-checking

My day and my class

Subject: History, geography and society Grade: K Lessons: 5 Time per lesson: about 35-40 minutes

Status: written (unreviewed AI draft; not human-educator-reviewed or classroom-tested)

Author: GLM-5.3 Flash

Big idea

Our class is a community. Our day has an order we can describe, a map can show our room from above, rules exist for reasons, and every choice costs something: when we pick one thing, we give something else up.

What students should be able to do

- Put four to six picture cards of the school day in order and describe the order with the words first, next, then and last, and use yesterday, today and tomorrow to talk about past and coming events.
- Build a small model of part of the classroom with blocks and draw a picture map of it from above that shows where at least four real things belong, then use the map to find a hidden object and name one thing the map leaves out.
- Name at least three roles in the classroom, including jobs students do, and one thing each role does, and explain that everyone, not just the teacher, does important jobs.
- Give a "so that..." reason for a class rule and take part in choosing one new class rule together.
- Sort familiar picture cards into needs and wants and explain one class choice with the frame "We chose ___, so we gave up ___."

What students should already know

Daily school routines (arrival, story, snack, play), common classroom objects by name, and turn-taking in a group. No reading or writing is assumed; the teacher reads all text aloud.

Use this oral diagnostic without treating it as an entry test:

1. What do we do right after lunch in our class day?
2. If a chair is not drawn on a picture of our classroom, is the chair gone?
3. Why do we have a rule about walking inside?

Diagnostic guide: (1) whatever the class routine is (rest or story time in most rooms); (2) no - a picture can leave things out; (3) answers vary, but a good one connects the rule to a purpose, such as so that nobody gets hurt. Revisit any uncertain answer during the unit.

Lesson list

1. First, next, last: order picture cards of our school day and use time words.
2. Our room from above: build a block model, draw a picture map of the classroom and use it to find a hidden object.

3. Who does what: roles and jobs in our class community.
4. Our class rules: make one class rule together and say why it exists.
5. Needs and wants: sort picture cards, make a class choice and name what we gave up. Ends with the unit's short assessment.

Materials (whole unit)

Paper, crayons or markers, glue sticks, sticky notes, building blocks or cubes, a small toy to hide, paper cups, chart paper, a marker, tape, ten counters or beans, two hula hoops or two taped circles on the floor, and picture cards of classroom events and objects. Every picture card in this unit can be drawn from the plain-text descriptions given in the lessons, so no printing is required. All picture materials have plain-text descriptions. Provide large-print labels, tactile cards, left- or right-handed scissors where cutting is used, and adult handling of any sharp tool. No live internet, account, purchase, field trip or children's personal family information is required.

Assessment

Lesson 5 ends with a five-part end task a teacher can run in about ten minutes, with a full answer guide in that lesson: sequence three day cards, sort two new need/want cards, point to the door on the lesson-2 classroom map, name one role and its job, and give the "so that..." reason for the class rule made in lesson 4. Students may answer orally, by pointing, or with picture cards. Assess the ideas, not drawing skill, speed, accent or language background. There is no validated pass threshold, and the task does not measure every skill in the unit.

Sources

Consulted November 5, 2026:

- College, Career, and Civic Life (C3) Framework for Social Studies State Standards, NCSS, 2013, via an Internet Archive snapshot of the publisher's PDF (the publisher's own site may be unreachable from some networks). The unit's strand language follows specific K-2 indicators, each checked verbatim in that PDF: D2.His.1.K-2 "Create a chronological sequence of multiple events"; D2.Geo.1.K-2 "Construct maps, graphs, and other representations of familiar places"; D2.Geo.2.K-2 "Use maps, graphs, photographs, and other representations to describe places and the relationships and interactions that shape them"; D2.Civ.1.K-2 "Describe roles and responsibilities of people in authority"; D2.Civ.2.K-2 "Explain how all people, not just official leaders, play important roles in a community"; D2.Civ.3.K-2 "Explain the need for and purposes of rules in various settings inside and outside of school"; D2.Civ.11.K-2 "Explain how people can work together to make decisions in the classroom"; and D2.Eco.1.K-2 "Explain how scarcity necessitates decision making"; D2.Eco.2.K-2 "Identify the benefits and costs of making various personal decisions". Alignment is limited to these named indicators; the whole framework was not reviewed, and no official endorsement is claimed.
- Developmentally appropriate practice (Wikipedia) - background for choosing short, active, play-based lessons with concrete materials and spoken language. General pedagogy background only.

These are background influences, not claims of official alignment or endorsement. All fictional scenarios, picture-card descriptions, questions and explanations in this unit are original CC0 material. Linked sources remain under their own terms.

Known gaps and cautions

Pacing, vocabulary load and accessibility are untested estimates; a qualified local educator should review the unit before classroom use. Family and home life are deliberately left out: no lesson asks children to share private family details, and the needs-and-wants work uses classroom objects and picture cards, not children's homes, possessions or family income. "Needs and wants" is a simplification: some pictures (a pet, a coat, a book) can reasonably go in either circle, so accept any placement a child can justify, and treat medicine, food, water and safety items as needs in these lessons. Classroom rules differ between real classrooms; these lessons treat rules as agreements a group makes, keeps and can change, not as fixed lists. If a child worries about whether their family has enough, reassure them concretely (water and snack are available here) and move on.

Lesson 1: First, next, last

Time: about 35-40 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: GLM-5.3 Flash.

Goal

Create a chronological sequence of school-day events with picture cards and describe it with the words first, next, then and last (D2.His.1.K-2 in the unit's Sources).

Materials

Six picture cards for a fictional class day, each drawable from these descriptions: (1) a door with a backpack - arrival; (2) an open book - story time; (3) a cup and apple - snack; (4) a ball - outside play; (5) a bin with toys going in - tidy-up; (6) the same door with the backpack going away - home time. Floor space or a pocket chart, and sticky notes.

Steps

1. Opening (5 min): Hold up two cards, snack and story time. Ask: "Which do we do first in our day? How do you know?" Take two or three answers without correcting yet.
2. Main activity (15 min): Shuffle all six cards. Children place them across the floor or chart in the order they think matches the class day, then the class checks together and moves any cards. Say the day together with the sentence frames: "First we ___. Next we ___. Then we ___. Last we ___." Then play "oops": the teacher secretly swaps two cards, and the class finds and fixes the day.
3. Discussion questions (8 min):
4. "What if we did tidy-up first, before we even played? Would the day still work?" - Example good answer: it would be strange because there would be nothing to tidy yet; the order has to make sense.
5. "Is our class's day the only right order?" - Example good answer: no, other classes do things in a different order and that is okay for them.
6. Yesterday/today/tomorrow frame on the board with a "done" basket and a "coming" basket for the cards: "Yesterday we ___. Today we will ___. Tomorrow we will ___."
7. Closing check (5 min): Show three cards in a row. Ask: "Which is first? Which is last? What comes next?" Answers: as laid out by the teacher; children point or say the word.

Vocabulary

first: what happens at the start next / then: what comes after last: what happens at the end yesterday: the day before today tomorrow: the day after today

Differentiation

- Extra support: work with three cards instead of six, and let one child move a single card while the teacher narrates.

- Extra challenge: a child makes their own four-card order for just the morning and explains one reason for it; or they place all six cards and say which card could swap with another and the day would still work.

⚠ Safety

Keep the floor card area clear of walkways so nobody steps on cards or friends.

Teacher notes

A common misconception is that the day's order is fixed by something magical rather than decided by people. Answer with a real example: the schedule changed one day (assemblies, rain) and the class still had a good day, because people make and change schedules. Some children will call every past event "yesterday"; the done/coming baskets give a physical model to sort that out. Pointing at cards is a full answer in this lesson; do not require every child to speak. The fictional cards deliberately describe a generic class day - if the class's real order differs, reorder the cards and keep the language frame, which is the actual goal.

Lesson 2: Our room from above

Time: about 35-40 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: GLM-5.3 Flash.

Goal

Build a model of part of the classroom and draw a picture map of it from above, then use the map to find a hidden object and name one thing the map leaves out (D2.Geo.1.K-2 and D2.Geo.2.K-2 in the unit's Sources).

Materials

Building blocks or cubes, one large sheet of paper per group or one shared chart, crayons, a small toy ("the mouse"), paper cups, tape.

Steps

1. Opening (5 min): Hold up a toy car or block at eye level. Ask children to draw it the way they see it from their chair (from the side). Then lift it high above the table and ask what it looks like from up there, like a bird sees it. Compare the two drawings.
2. Main activity (15 min): Part A (5 min): each group builds a tiny model of one corner of the classroom with blocks - a table, some chairs, a shelf. Part B (10 min): the teacher draws the classroom walls as a big rectangle on the chart and marks the door. The class replaces the blocks one at a time with drawn symbols on the paper - a circle for each table, a square for the shelf - and decides together what each symbol means, making a key on the side: circle = table, square = shelf, dot = chair.
3. Discussion questions (8 min): Play "find the mouse". One child hides a small toy under a paper cup somewhere real in the room. The class marks the spot on the map, and a searcher, using only the map, walks to the marked spot and finds it. Then ask:
4. "What did our map leave out?" - Example good answer: anything not drawn, such as the rug pattern, the windows, or the coat hooks; a map is not the whole room.
5. "Is the map the room?" - Example good answer: no, the room is real and the map is a picture of it from above.
6. Closing check (5 min): Ask children to point to the door on the map, point to where their table is, and name one thing the map does not show. Answers: check by pointing; omission answers vary and all reasonable answers count.

Vocabulary

map: a picture of a place as it looks from above above: what you see when you look down on something symbol: a small drawing that stands for a real thing key: the list that says what each symbol means

Differentiation

- Extra support: map just the rug area with two objects; give some children the walls already drawn.

- Extra challenge: a child draws where a new bookshelf could go on the map and says one reason for that spot; or maps the play corner on their own paper.

⚠ Safety

The searcher walks; searchers do not run, and the hiding spot is under a cup on the floor or a table, never up high.

Teacher notes

The most common confusion is between side views and top views: a child may say the map is "wrong because the table doesn't look like that". Hold the real table next to the drawn circle and look from above together. Another misconception is that maps must be beautiful or complete; a map needs to be useful, not pretty, and every map leaves things out. Accept any consistent symbol as long as the key says what it means; wobbly circles are fine. This lesson deliberately stays inside one room: neighbourhood maps come later in the progression (grade 1), and scale, grids and legends come in grade 3.

Lesson 3: Who does what

Time: about 35-40 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: GLM-5.3 Flash.

Goal

Name roles and jobs in the classroom community - including jobs students do - and explain that everyone, not just official leaders, does important jobs (D2.Civ.1.K-2 and D2.Civ.2.K-2 in the unit's Sources).

Materials

Chart paper, marker, sticky notes, crayons, optional paper "helper badges".

Steps

1. Opening (5 min): Ask: "Who is in charge of our class?" Collect answers on the chart with quick drawings - the teacher, the principal, "everybody". Do not settle the question yet.
2. Main activity (15 min): Build a jobs web. Write "our class" in the middle. Add spokes for roles: the teacher (reads stories, helps when someone is hurt, plans the day), the students (listen, tidy up, help friends), the line leader (walks first), the shelf helper (returns books), the plant or pet helper (waters or feeds, with the teacher checking), the door holder (holds the door). Each child draws themselves doing one job on a sticky note and adds it to the web. Point out the rotation: classroom jobs turn, so everyone gets every job over time.
3. Discussion questions (8 min):
4. "What would happen if nobody did the tidy-up job?" - Example good answer: the room would get messy and unsafe; everyone's job matters.
5. "Does the teacher do every job in the class?" - Example good answer: no, the class only works because students and teacher all have jobs.
6. "Who is in charge of feeding the fish?" - Example good answer: the pet helper, with the teacher checking. Then: name a person with an important job outside our class that you know (the principal, the crossing guard, the librarian) and one thing that person does.
7. Closing check (5 min): Each child names two jobs they do in the class and one job the teacher does. Answers vary; accept any real class job.

Vocabulary

role: the job a person has responsibility: a job you promised to do community: a group of people who share a place and help each other

Differentiation

- Extra support: offer two real photos to choose between ("which one is the line leader?").
- Extra challenge: a child invents a new classroom job we do not have yet and says what it does and why it would help.

⚠ Safety

None.

Teacher notes

The key misconception is that the teacher is the only person with important jobs; the lesson's point is the opposite. If children start assigning jobs by gender ("girls water plants"), redirect plainly: in our class any one of us can do any job, and jobs rotate. Keep the conversation inside the classroom - do not ask children what jobs their family members do, which drifts into private family life. If a child says only the principal is "in charge", accept that people in authority have real roles (D2.Civ.1.K-2) and add that the class does not work without everyone's roles too.

Lesson 4: Our class rules

Time: about 35-40 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: GLM-5.3 Flash.

Goal

Give a "so that..." reason for a class rule and take part in choosing one new class rule together (D2.Civ.3.K-2 and D2.Civ.11.K-2 in the unit's Sources).

Materials

Chart paper, marker, sticky notes, the class's existing rules if they are written somewhere.

Steps

1. Opening (5 min): Read a two-sentence fictional story: "In Room 12, some children ran inside at arrival time, and one friend bumped the block shelf. The blocks crashed down." Ask: "What could help?" Take answers until someone lands near the idea of a rule.
2. Main activity (15 min): Write one existing class rule on the chart and find its reason together with the frame: "We walk inside... so that nobody gets hurt." Then make one new rule together. First name the discussion rules out loud - one voice at a time, we listen to the speaker - and point out that these are rules too, with reasons. Children offer rule ideas and the teacher writes every idea on a sticky note without judging. The class narrows to two finalists and votes by raised hands or by moving to two corners. Mark the winning rule and its "so that..." reason on the chart.
3. Discussion questions (8 min):
4. "Is the walking rule the same outside?" - Example good answer: no, outside we can run at play time; rules change with the place, which is why we say where a rule works.
5. "What if our new rule does not work?" - Example good answer: we can talk about it and change it together, because people make rules and people can change them.
6. Closing check (5 min): Read the new rule with its "so that" reason together. Each group says one reason rules help people. Answers vary; a good answer connects the rule to someone being safe, kind or able to learn.

Vocabulary

rule: an agreement about how we act vote: a way for a group to choose together reason: the why behind what we decide

Differentiation

- Extra support: let a child choose between two picture-proposed rules instead of proposing one.
- Extra challenge: a child finds one rule that changes between two places (inside and outside, classroom and library) and explains why.

⚠ Safety

If a child proposes a rule that names or blames another child, redirect to rules about what we all do, not about who did something.

Teacher notes

The misconception to watch is "rules are just what the teacher says". This lesson treats rules as agreements a group makes for reasons, so keep the teacher's authority out of the vote and let the reason do the work. Voting creates a minority: if a child says "but I didn't vote for it", an honest answer is "You can disagree and still follow it while we try it, and if it does not work we will change it." Avoid framing rules as only about stopping bad behaviour; ask what each rule lets us do (running games happen outside because of the inside-walking rule, not despite it).

Lesson 5: Needs and wants

Time: about 35-40 minutes (untested estimate), plus a 10-minute end task

Status: unreviewed AI draft; not classroom-tested. Author: GLM-5.3 Flash.

Goal

Sort familiar pictures into needs and wants, and explain one class choice with what it cost: "We chose ___, so we gave up ___" (D2.Eco.1.K-2 and D2.Eco.2.K-2 in the unit's Sources).

Materials

Two hula hoops or two taped circles on the floor labelled NEED and WANT, picture cards drawable from these descriptions: water bottle, apple, pet food, soap and sink, bandage, crayons, balloon, toy robot, bubbles, book, small plant. A class wish-list chart (new puzzle, plant for the window, bubbles, extra story time) and ten counters or beans.

Steps

1. Opening (5 min): Say: "Pretend our table has four friends and one box of crayons. Do all four friends get to draw at once?" Let the problem sit. Name it: there is not enough for everyone who wants it, and that is why we have to choose (the grown-up word is scarcity).
2. Main activity (15 min): Part A (8 min): sort the picture cards into the two circles. Needs are things we must have to be safe and healthy; wants are things we would like but can be okay without. When a card could go in either circle - the book, the plant, the pet food - place it together with a child's "why" and leave it there; both placements can be right. Part B (7 min): the class choice. The class has ten counters and a wish list with four wishes; each wish costs five counters, so the ten counters buy exactly two wishes. The class picks wishes until the counters are gone, and the teacher names the cost out loud with the class: "We chose the puzzle and the plant, so we gave up the bubbles and extra story time for now."
3. Discussion questions (8 min):
4. "Was that choice easy or hard? What made it hard?" - Example good answer: hard, because we liked more than one thing and there were not enough counters.
5. "If we get five more counters next week, what should we choose first? Why?" - Example good answer: any pick with a reason; this introduces planning and saving in a kindergarten-sized way.
6. Closing check (5 min): Show a bandage card and a balloon card. Ask: "Which one is a need? Why?" Answer: the bandage, because it helps keep us safe and healthy; accept any "why" that mentions health or safety. Then run the unit's end task below.

Unit end task (about 10 minutes, with answer guide)

Run the five parts one child at a time or in small groups; answers may be spoken, pointed, or shown with cards. There is no pass threshold; use it to see what to revisit.

1. Put three day cards from lesson 1 in order and say which is first and which is last. Guide: order matches the cards' story; first = start card, last = end card.

2. Sort two cards from the lesson set into the circles: soap (need - keeps us clean and healthy) and a toy robot (want - nice to have). Any placement with a health-or-safety reason for a "need" call counts.
3. Point to the door on the lesson-2 classroom map. Guide: points to the marked door symbol.
4. Name one role in the class and one thing that role does. Guide: any real class role, including student jobs and the teacher's.
5. Say the "so that..." reason for the class rule made in lesson 4. Guide: the reason recorded on the chart in lesson 4, in the child's own words.

Vocabulary

need: something we must have to be safe and healthy want: something we would like but can be okay without choice: picking one thing over other things scarcity: when there is not enough of something for everyone who wants it

Differentiation

- Extra support: sort four cards, starting with the two clearest ones; let a child place cards while the teacher narrates.
- Extra challenge: a child finds a card that could fit both circles and justifies one placement; or proposes what the class should save for next and why.

⚠ Safety

None.

Teacher notes

Watch for the misconception that wants are bad. Wants are normal and fine; the lesson is about what happens when there is not enough for every want. Never use children's family situations as examples - no questions about what their families own or buy; keep everything at the level of classroom objects and the shared wish list. Need lists differ by place and season (a fan is a need in a hot classroom, boots in a snowy one), so accept local reasoning with a why. If a child becomes worried about whether their own family has enough, reassure them concretely (water and snack are right here) and move on. This lesson deliberately stops short of money, prices and saving accounts, which the progression places in later grades.

Kindergarten Society: Families, Then and Now, and People Who Help Us (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 6 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. CC0 1.0 (public domain). Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the kindergarten year plan

This is the **term 2** society unit in the kindergarten year plan. It follows My day and my class (term 1, by GLM-5.3 Flash), which deliberately left family and home life out. This unit brings them in carefully: children talk about families using **made-up picture cards**, and nobody is ever asked to share details, photos or stories about their own home.

Big idea

Families and homes come in many shapes, and all of them are real families. Things change over time: toys, phones and streets looked different long ago, and we can find out how from old objects and photos. Many people help us every day, not only people in charge.

Outcomes

By the end of the unit, most children can:

1. Say that families can be different sizes and shapes, and give one example from the picture cards (for example "this family has one grown-up and two children").
2. Sort a few objects or pictures into "long ago" and "now" (some things are "both"), and say one clue they used.
3. Put three pictures in order: long ago, when today's grown-ups were small, now.
4. Say one thing an old photo can tell us and one thing it cannot.
5. Name two people who help at school or nearby and say what each one does.

These are expectations for most children, not gates. Some will need more time; grade 1 returns to time order and community helpers.

Prior knowledge

- From term 1: first, next, last; yesterday, today, tomorrow; classroom jobs and why rules help.
- No reading is needed. Everything is done with pictures, objects and talk.

Lessons

Lesson	Title	Time
1	Many kinds of families and homes	20 min

Lesson	Title	Time
2	Old toys and new toys	25 min
3	Photos from long ago	25 min
4	People who help us	25 min
5	Helper visit and show what you know	25 min, plus about 3 min per child one-to-one during the week

Materials (whole class unless noted)

- **Family picture cards** (8 to 10, drawn or printed, made up): for example one grown-up and one child; two grown-ups and three children; a grandparent and a child; two mums; two dads; a big family with cousins; a family living in a flat; a family that has just moved; a child with a foster carer. No real children's families.
- A soft toy or puppet ("Pip") who "lives" in a made-up home, for the teacher to talk about.
- Lesson 1: five pictures of different homes (a house, a flat in a tall building, a boat home, a caravan or trailer, a farmhouse).
- Old and new objects (or pictures): for example a wooden spinning top and a toy car with buttons; a teddy bear (both); a landline phone with a cord and a mobile phone; a paper map and a phone map picture.
- Three or four old photos of streets, schools or shops. Use public-domain or openly licensed photos (for example from a local library or archive), or photos the school owns. Black-and-white photos work well.
- Lesson 2: two hoops or mats labelled with pictures, **long ago** (an old clock) and **now** (a tablet), and a tablet picture for the closing check (also used in lessons 3 and 5).
- Lesson 3: one photo of the same kind of place now (for example your school or a local street).
- Three large timeline cards: **long ago**, **when grown-ups were small**, **now**, each with one matching picture: a horse and cart; a car with a cassette player or a box-shaped television; a tablet.
- Helper picture cards: teacher, school cook, cleaner or caretaker, crossing guard, librarian, nurse, firefighter, bus driver, shop worker, a neighbour helping.
- Lesson 4: a large sheet with two areas, **at school** and **near school**; object pictures of a hose, a pot and a book for the support task.
- Paper and crayons for the lesson 4 stretch drawing and the lesson 5 thank-you drawing.
- A sticker or star chart for the one-to-one checks in lesson 5.

Assessment

Lesson 5 has a five-part check done one-to-one (about 3 minutes per child) over the week. Record each part as **yes**, **with help** or **not yet**:

1. Families: points to two different family cards and says one way they are different.
2. Then and now: sorts four objects or pictures into long ago / now (a "both" answer with a reason is correct).
3. Order: puts the three timeline pictures in order.
4. Photos: says one thing a photo shows and one thing it cannot tell us.
5. Helpers: names two helpers and what they do.

The check is never about the child's own family. A child who answers using Pip or a made-up family is answering correctly.

Sources

Read for this unit (background only; this unit is not aligned to them):

- National Council for the Social Studies, College, Career, and Civic Life (C3) Framework for Social Studies State Standards (2013), K-2 indicators, read in the archived PDF: https://web.archive.org/web/20220403055307/https://www.socialstudies.org/sites/default/files/2017/Jun/c3-framework-for-social-studies-rev0617.pdf
  - D2.His.1.K-2 "Create a chronological sequence of multiple events." (lesson 3 timeline)
  - D2.His.2.K-2 "Compare life in the past to life today." (lessons 2 and 3)
  - D2.His.10.K-2 "Explain how historical sources can be used to study the past." (lesson 3 photos)
  - D2.Civ.2.K-2 "Explain how all people, not just official leaders, play important roles in a community." (lesson 4)
  - D2.Civ.1.K-2 "Describe roles and responsibilities of people in authority." (lesson 4, briefly)
- The term 1 unit My day and my class, for what children already know.

Known gaps and cautions

- **Family privacy.** Never ask children to bring family photos, draw their own family, name family members or describe their home. If a child chooses to share, listen warmly and move on; don't ask follow-up questions in front of the class. Some children live with foster carers or kinship carers, have lost a family member, have parents who live apart, have recently moved, or have no stable home. None of these is ranked as better or worse.
- **Safeguarding.** If a child says something that worries you, follow your school's safeguarding procedure, not this unit.
- **Emergency numbers differ by country** (for example 911, 999, 112, 000). Check the local number and your school's policy before lesson 4. Don't have children practise dialling on a real phone.
- **"Long ago" is fuzzy at this age.** Children often mix up "when grandparents were small" and "very long ago". The three-card timeline is a start, not a precise scale.
- **Overlap with grade 1.** The society progression plans grade 1 around "then and now" (old and new versions of everyday objects). This unit is a first, picture-based look; grade 1 should go deeper (more objects, simple reasons for change), not repeat these lessons.
- Helper examples reflect common jobs in many towns; swap in local ones. Avoid showing jobs as belonging to one gender.
- Peer check: Gemini 4 Argon did a bounded text, timing and answer-key check at d18fb8c (not an educator or accessibility review). Its notes (materials list out of sync with the lessons; non-speaking routes in lessons 1-4; a low-vision route for the photo comparison) were fixed in the follow-up commit 66519de (see PEERCHECKS.md), which Argon also diff-checked the same day.

Lesson 1: Many kinds of families and homes

Back to the unit

Goal

Children see that families and homes come in many shapes, and that every one shown is a real family.

Materials

- Family picture cards (8 to 10, made up; see the unit materials list).
- Pip the puppet or soft toy. (No puppet? Use a drawing of a made-up child called Pip.)
- Pictures of different homes: a house, a flat in a tall building, a boat home, a caravan or trailer, a farmhouse.

Steps

✎ Opening (5 min)

1. Introduce Pip: "Pip lives in a flat on the third floor with Grandma and a cat called Button."
2. Ask: "Who is in Pip's family?" (Grandma, Pip, and Button the cat if the children say so.)
3. Say: "Pip's family is one kind of family. Let's meet some more made-up families."

✎ Main activity (12 min)

1. Show the family cards one at a time. For each, ask: "Who is in this family? How many grown-ups? How many children?"
2. Lay out the home pictures. Ask: "Where could a family live?" Point out that any family could live in any kind of home.
3. Pairs pick two family cards and find one thing that is **different** and one thing that is the **same** (for example "different: this one has two dads, this one has one mum"; "same: they both have a child").
4. Share two or three pairs' ideas with the class.

✓ Discussion questions (with answers)

- "Is a family with one grown-up a real family?" **Yes.**
- "Is a family where a grandparent looks after the child a real family?" **Yes.**
- "Do all families live in houses?" **No.** Some live in flats, boats, caravans or other homes.
- "What do the people in a family often do for each other?" Accept: look after, cook, play, love, help, keep safe.

✓ Closing check (with answers) (3 min)

Hold up two cards (one grown-up and one child; two grown-ups and three children). Ask: "How are these families different?" **Accept any true difference**, for example "that one has more people" or "that one has two grown-ups".

Vocabulary

family, home, grown-up, grandparent, different, same

Differentiation

- **Needs more support:** count the people on one card together, pointing to each.
- **Access:** pointing, signing, gesture or a communication device count the same as speaking.
- **Ready for more:** sort all the cards by number of children, or by "has a grandparent / doesn't".

⚠ Safety

- Don't ask children about their own family. If a child volunteers, say "Thank you for telling me" and carry on.
- If a child says something that worries you, follow your school's safeguarding procedure.

Teacher notes and misconceptions

- Children may say a family "has to have a mum and a dad". Answer calmly: "Some do, and some families look different. They are all families."
- Pets: some children count pets as family. That's fine; don't argue.
- Keep the tone matter-of-fact. The point is that variety is normal, not that any family is special or sad.

Lesson 2: Old toys and new toys

Back to the unit

Goal

Children compare objects from long ago with objects from now, and use clues to decide which is which.

Materials

- Old and new objects or pictures (see the unit materials list): wooden spinning top, toy car with buttons, teddy bear, corded landline phone, mobile phone, paper map, phone map picture.
- Two hoops or mats labelled with pictures: **long ago** (an old clock) and **now** (a tablet).
- A small space between the hoops for **both**.

Steps

✎ Opening (5 min)

1. Hold up the corded landline phone. Ask: "What is this? How would you use it?"
2. Hold up a mobile phone (or picture). "These both let people talk to someone far away. Which one is from long ago?"
3. Ask "How can you tell?" Accept: the cord, the buttons, it is heavy, it is old-looking.

✎ Main activity (15 min)

1. Hand out the objects to small groups (the teacher keeps anything fragile).
2. Each group decides: long ago, now, or both? They put the object in a hoop and say one clue.
3. Go through each object together:
    - Wooden spinning top: **long ago** (children also play with tops now, so "both" with a reason is accepted).
    - Toy car with buttons and batteries: **now**.
    - Teddy bear: **both**. Teddy bears were made long ago and are still made now.
    - Corded landline phone: **long ago** (some homes still have one, so "both" with a reason is accepted).
    - Mobile phone: **now**.
    - Paper map: **both**. People used them long ago and still use them.
    - Phone map picture: **now**.
4. Ask: "What clues helped you?" Collect clues: batteries, screens, cords, wood, faded colours.

✓ Discussion questions (with answers)

- "Did children long ago have toys?" **Yes.** They had toys too, often made of wood, metal, cloth or paper.
- "Can something old still be used now?" **Yes**, for example a teddy bear or a paper map.
- "Does 'old' always mean 'worse'?" **No.** Old things can still work well and be loved.

✓ Closing check (with answers) (5 min)

Show three pictures: a spinning top, a tablet, a teddy bear. Ask each child (or pairs) to point: long ago, now, or both? **Answers:** top = long ago (or both, with a reason); tablet = now; teddy bear = both.

Vocabulary

old, new, long ago, now, both, clue

Differentiation

- **Needs more support:** compare just two objects (the landline phone and the mobile phone).
- **Access:** pointing, signing, gesture or a communication device count the same as speaking. A child with low vision can handle the real objects (top, teddy, phones) instead of pictures.
- **Ready for more:** "What might a toy look like when you are a grown-up?" (no right answer).

⚠ Safety

- The teacher handles anything fragile, sharp or with small parts.
- Wash or wipe old objects before use; some may be dusty.

Teacher notes and misconceptions

- Children often think "long ago" means "dinosaurs". That's fine to hear; lesson 3 builds a simple timeline.
- Accept "both" whenever the child gives a sensible reason. The aim is using clues, not one fixed answer.
- Don't ask children to bring toys from home; some families can't or won't.

Lesson 3: Photos from long ago

Back to the unit

Goal

Children learn that old photos help us find out about the past, notice what a photo can and cannot tell us, and put three pictures in time order.

Materials

- Three or four old photos of streets, schools or shops (public-domain, openly licensed or school-owned).
- One photo of the same kind of place now (for example your school or a local street).
- Three large timeline cards: **long ago**, **when grown-ups were small**, **now**.
- For each timeline card, one matching picture: for example a horse and cart (long ago), a car with a cassette player or a box-shaped television (when grown-ups were small), a tablet (now).

Steps

✎ Opening (5 min)

1. Show an old black-and-white street photo. Ask: "What can you see?"
2. Ask: "Is this from long ago or now? What clues tell you?" Accept: black and white, old cars or carts, old clothes, no screens.

✎ Main activity (15 min)

1. **Detectives (8 min).** Show the old school or shop photo next to the photo from now. Children take turns saying "In the old photo I see…" and "Now I see…". Write or draw their ideas in two columns.
2. **What can't the photo tell us? (3 min).** Ask: "Can the photo tell us what the people were saying? What the weather felt like? If they were happy?" Agree: photos show what things looked like, but not sounds, smells, or what people thought. We would need other clues, like asking people or reading.
3. **Timeline (4 min).** Put the three timeline cards on the floor in order. Show the three matching pictures one at a time; children decide which card each belongs on.

✓ Discussion questions (with answers)

- "How do we know what streets looked like long ago?" **From old photos, old objects, and from people who remember.**
- "Can a photo tell us what someone was thinking?" **No.**

- "Were the grown-ups at our school alive long ago, when the horse-and-cart photo was taken?" Usually **no**, if the photo is very old (for example over 100 years). Check the date of your photo before asking.

✓ Closing check (with answers) (5 min)

Mix up the three matching pictures. A volunteer (or each small group) puts them in order on the timeline cards. **Answer:** horse and cart → long ago; cassette car or box television → when grown-ups were small; tablet → now. Then ask one child: "Tell me one thing the old photo shows, and one thing it can't tell us." **Accept** any visible detail for the first part, and any of sounds, smells, feelings, thoughts, names or what happened next for the second.

Vocabulary

photo, long ago, now, clue, past, timeline

Differentiation

- **Needs more support:** use only two cards, long ago and now.
- **Access:** pointing, signing, gesture or a communication device count the same as speaking.
- **Low vision:** describe each photo aloud in short, concrete phrases ("a horse pulling a cart, people in long coats, no cars"), and where possible pass round a real object that matches (an old key, a cassette tape, a tablet) so the child can compare by touch.
- **Ready for more:** add a fourth photo and decide where it goes, with a reason.

⚠ Safety

- No safety issues beyond normal classroom care.

Teacher notes and misconceptions

- Many children think old photos are black and white because "the world was grey then". Explain simply: cameras long ago usually could not show colours.
- "When grown-ups were small" depends on your staff's ages. Choose a matching picture that fits roughly 20 to 40 years ago.
- Don't ask children to bring family photos. Use school, library or openly licensed photos only.
- If you use a grown-up's childhood memories, ask a staff member who is happy to share, not a child's family.

Lesson 4: People who help us

Back to the unit

Goal

Children name people who help at school and nearby, say what they do, and see that everyone can help, not only people in charge.

Materials

- Helper picture cards (see the unit materials list).
- Before the lesson: check the local emergency number and your school's policy on teaching it.
- A large sheet with two areas drawn: **at school** and **near school**.

Steps

✎ Opening (5 min)

1. Ask: "Who helped you today, before you came into class?" Accept any answer (a crossing guard, a bus driver, someone who opened the door). Don't ask about home.
2. Say: "Lots of people help us every day. Let's find out who."

✎ Main activity (15 min)

1. **School helpers (5 min).** Show helper cards for school (teacher, cook, cleaner or caretaker, librarian, school nurse if you have one). For each: "What does this person do to help us?"
2. **Near school (5 min).** Show cards for community helpers (crossing guard, firefighter, bus driver, shop worker, a neighbour helping). Children place each card on the sheet: at school or near school.
3. **Everyone helps (5 min).** Ask: "Who is in charge at our school?" (the head teacher or principal). "What do they do?" Then ask: "Can someone who is not in charge help too?" Show the neighbour card and talk about class jobs from term 1. Agree: **everyone can help** — children too, by tidying up, sharing or being kind.

✓ Discussion questions (with answers)

- "What does a crossing guard do?" **Helps people cross the road safely.**
- "What does a cook at school do?" **Makes food for us to eat.**
- "Is the head teacher the only person who helps at school?" **No.** Many people help.
- "Who can help in an emergency?" Firefighters, police, ambulance workers; a trusted grown-up nearby. Use your local emergency number if your school teaches it.

✓ Closing check (with answers) (5 min)

Hold up two helper cards (for example crossing guard and cook). Ask: "Who is this? How do they help?" **Answers:** crossing guard helps people cross the road safely; cook makes our food. Accept any sensible helping action.

Vocabulary

helper, job, help, in charge, community, emergency

Differentiation

- **Needs more support:** match three helper cards to three object pictures (hose, pot, book).
- **Access:** pointing, signing, gesture or a communication device count the same as speaking.
- **Ready for more:** "How could you help at school tomorrow?" Draw it.

⚠ Safety

- Don't have children practise calling an emergency number on a real phone.
- Some children may be frightened of police or other services because of their own experiences. Keep the tone calm and don't push.

Teacher notes and misconceptions

- Children often think only people with uniforms are helpers. The neighbour card and class jobs widen this.
- Avoid gender stereotypes (for example "firemen"). Use "firefighter", "police officer".
- If a visitor is coming in lesson 5, tell the children today so they can think of a question.

Lesson 5: Helper visit and show what you know

Back to the unit

Goal

Children ask a real helper questions, then show what they learned across the unit in a short one-to-one check.

Materials

- A helper visitor from school (for example the cook, caretaker, librarian or school nurse). If nobody can come, use a short video your school already has permission to use, or the teacher plays the helper.
- Family cards, old and new objects or pictures, the three timeline cards and matching pictures, one old photo, helper cards.
- A recording sheet (yes / with help / not yet for each of the 5 parts).

Steps

✎ Opening (5 min)

1. Remind children of the questions they thought of in lesson 4.
2. Practise one together: "What do you do to help our school?"

✎ Main activity (15 min)

1. **Visit (10 min).** The helper says what they do and shows one tool of their job. Two or three children ask questions.
2. **Thank you (5 min).** Children say thank you together. Each child draws one thing the helper does (no names or words needed).

✓ Discussion questions (with answers)

- "What does our visitor do to help us?" **Answer depends on the visitor;** accept any correct job description.
- "Was our visitor in charge of the school?" Usually **no** — and they still help a lot.

✓ Closing check (with answers) (5 min)

Whole class, quick: hold up a teddy bear. "Long ago, now, or both?" **Both.**

One-to-one check (about 3 min per child, over the week)

Use the five parts from the unit assessment. Record **yes**, **with help** or **not yet**.

1. **Families:** "Point to two families. How are they different?" Accept any true difference.
2. **Then and now:** sort four pictures: spinning top (long ago, or both with a reason), tablet (now), corded landline phone (long ago, or both with a reason), teddy bear (both).
3. **Order:** put horse and cart, box television, tablet on the three timeline cards. **Answer:** long ago, when grown-ups were small, now.
4. **Photos:** "Tell me one thing this old photo shows, and one thing it can't tell us." Accept any visible detail; accept sounds, smells, feelings, thoughts, names or what happened next.
5. **Helpers:** "Tell me about two helpers and what they do." Accept any two correct.

Vocabulary

visitor, question, helper, thank you

Differentiation

- **Needs more support:** in the check, offer two choices ("Is this long ago or now?") and record "with help".
- **Ready for more:** ask "Why do you think this changed?" in part 2 (no fixed answer).
- Children who use sign, gesture, pointing or a communication device: answers in those forms count as "yes".

⚠ Safety

- Follow your school's visitor policy.

Teacher notes and misconceptions

- Keep the check friendly; it is a chat, not a test. Stop if a child is upset.
- The check is never about the child's own family. Answers about Pip or a made-up family are correct.
- "Not yet" is fine. Grade 1 returns to time order and community roles.

Kindergarten Society: Near and Far, Our School Walk and a Picture Map (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 6 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. CC0 1.0 (public domain). Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the kindergarten year plan

This is the **term 3** society unit in the kindergarten year plan. It builds on My day and my class (term 1, by GLM-5.3 Flash), where children already looked at the classroom "from above" and drew a picture map of it, and on Families, then and now, and people who help us (term 2). This unit goes one step wider: from one room to the **whole school**, with words for where things are (near, far, next to, in front of, behind).

Big idea

We can say where things are with words like near, far, next to, in front of and behind. A map is a picture of a place from above, and it can help us find our way and tell someone else where something is. Some things in a place are made by people and some are natural.

Outcomes

By the end of the unit, most children can:

1. Use **near**, **far**, **next to**, **in front of** and **behind** to say where a toy is on a small play-mat town.
2. Follow a spoken position clue to find a hidden object in the classroom ("It is next to the sink, behind the box").
3. Name four or more places in the school they visited on the walk, and one thing they noticed at each.
4. Sort things seen on the walk into **made by people** and **natural** (some are hard to sort, and saying why is a good answer).
5. Point to places on a simple picture map and say which of two places is **nearer** to a third.
6. Put three photos from the walk in the order we walked (first, next, last).

These are expectations for most children, not gates. Grade 1 returns to the school walk and makes a route map of the local area.

Prior knowledge

- From term 1: a map shows a place from above; the classroom picture map; first, next, last.
- From term 2: people who help at school (the walk may meet some of them).
- From mathematics: position words such as next to, in front of and behind may already be familiar.
- No reading is needed. Everything is done with toys, photos, pictures and talk.

Lessons

Lesson	Title	Time
1	Near, far and next to	20 min
2	Where is Pip? Clues around the classroom	25 min
3	Our school walk	30 min
4	A picture map of a school	25 min
5	Our walk in order, and show what you know	25 min, plus about 3 minutes per child one-to-one during the week

Materials (whole class unless noted)

- **Play-mat town** (set up once, kept the same for lessons 1 and 5): on a mat or large sheet, in one line along the back, from one end: a toy **house**, a toy **tree** touching the house, a gap, a box **shop**, then a long gap and a **pond** (blue paper). A toy **car** sits in front of the shop and a **teddy** sits behind the shop. Take a photo of the layout so it can be set up the same way again.
- **Pip** (the puppet from term 2) and one small object to hide (for example a toy key).
- The term 1 classroom picture map, if you still have it.
- **For the walk:** a camera or tablet for the teacher (photos of places, not faces), a clipboard, and enough adults for your school's ratio rules.
- **Pip's school map** (made up, the same for every class): a large card divided into six picture boxes in two rows. Top row, from left: **garden**, **playground**, **hall**. Bottom row, from left: **gate**, **office**, **classroom**. Draw a simple picture in each box. A copy for the teacher's check in lesson 5.
- A large sheet of paper with a simple outline of your own school grounds from above (drawn by the teacher before lesson 4), and printed photos from the walk.
- Two sorting hoops or mats labelled with pictures: **made by people** (a brick) and **natural** (a leaf).
- Sticky notes and a marker (lessons 2 and 4); paper and crayons or pencils (lessons 4 and 5).
- Picture cards of things often seen at school (for example a bench, a tree, a fence, grass, a flower bed, a bin, a stone, a door), about 8, for sorting in lesson 3. Swap in things your class actually saw.
- A sticker chart for the one-to-one checks.

Assessment

Lesson 5 has a six-part check done one-to-one (about 3 minutes per child) during the week, using the play-mat town (set up as in lesson 1), Pip's school map and three walk photos. Record each part as **yes**, **with help** or **not yet**:

1. Play-mat town: "What is next to the house?" **The tree.**
2. "Is the pond near the house or far from the house?" **Far.**
3. "What is in front of the shop?" **The car.** "What is behind the shop?" **The teddy.**
4. Pip's school map: "Point to the hall." **Top row, right-hand box.**
5. "Which is nearer to the gate: the office or the classroom?" **The office.**
6. Three walk photos: "Put these in the order we walked." **The order of your walk.**

Outcomes 2 to 4 (following a clue, naming places, made by people or natural) are observed during lessons 2 and 3 rather than checked one-to-one. A child may answer by pointing. The check is about the toys, Pip's map and the school, never about the child's home.

Sources

Read for this unit (background only; this unit is not aligned to them):

- National Council for the Social Studies, College, Career, and Civic Life (C3) Framework for Social Studies State Standards (2013), K-2 geography indicators, read in the archived PDF: https://web.archive.org/web/20220403055307/https://www.socialstudies.org/sites/default/files/2017/Jun/c3-framework-for-social-studies-rev0617.pdf
  - D2.Geo.1.K-2 "Construct maps, graphs, and other representations of familiar places." (lesson 4 school map)
  - D2.Geo.2.K-2 "Use maps, graphs, photographs, and other representations to describe places and the relationships and interactions that shape them." (lessons 3 to 5, walk photos and maps)
  - D2.Geo.3.K-2 "Use maps, globes, and other simple geographic models to identify cultural and environmental characteristics of places." (lessons 3 and 4, made by people and natural; simplified)
- Common Core State Standards, Kindergarten Geometry, K.G.A.1, which includes describing "the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to": https://www.thecorestandards.org/Math/Content/K/G/ (lessons 1 and 2)
- Wikipedia, "Mental mapping" (a person's point-of-view picture of an area; Kevin Lynch's sketch maps drawn from memory), background for the lesson 5 stretch task: https://en.wikipedia.org/wiki/Mental_mapping
- The term 1 unit My day and my class, for what children already know.

Known gaps and cautions

- **Home privacy.** Never ask children to describe or draw their route from home, their home address or where they live. All maps in this unit are of the play-mat town, Pip's made-up school, the classroom or the school grounds.
- **Walk safety.** Lesson 3 stays inside the school grounds. If you also look at the street, do it from inside the gate or fence. Follow your school's rules on adult ratios, risk assessment and permissions; this unit does not replace them.
- **Photos.** Photograph places, not children. Follow your school's photo policy.
- **Access.** Plan the walk on a route every child can use, including wheelchair users, and include quiet stops for children who find noise hard.
- **"Near" and "far" are relative.** The pond is far from the house but near the end of the mat. Answers depend on "near to what?", so always name the second place.
- **Left and right are not taught here.** They are hard at this age and left out on purpose.
- **Overlap with grade 1.** The society progression plans grade 1 around "a walk around the school and a route map". This unit stays inside the school and makes a picture map, not a route map of the local area; grade 1 should go wider, not repeat it.
- "Made by people" and "natural" is a simplification. A planted flower bed or a stone wall can be both, and saying why is a good answer.
- Order, timings and the play-mat layout are my choices, not taken from any source.

- Peer check: Gemini 4 Argon did a bounded text, timing and answer-key check on 6 November 2026 at bcdc103 (recorded in PEERCHECKS.md); fixes are in 95c73ce, which Argon also diff-checked the same day.

Lesson 1: Near, far and next to

Back to the unit

Goal

Children use **near**, **far**, **next to**, **in front of** and **behind** to say where toys are on a small play-mat town.

Materials

- The play-mat town, set up as in the unit materials list: in one line along the back, a house, a tree touching the house, a gap, a box shop, a long gap, then a blue paper pond. A toy car in front of the shop; a teddy behind the shop.
- Pip the puppet.

Steps

✎ Opening (5 min)

1. Children sit in a circle. Say: "Stand **next to** your chair. Now stand **behind** your chair. Now stand **in front of** your chair." Children who use a wheelchair or prefer to sit can point to the place instead, or move Pip.
2. Point to two things in the room: "Is the door **near** us or **far** from us?" Accept the answer that fits your room, and ask how they know.

✎ Main activity (10 min)

1. **Tour the town (4 min).** Gather children so they can all see the mat from the front (the side with the car). Name each place: house, tree, shop, pond. Ask:
   - "What is **next to** the house?" **The tree.**
   - "Is the pond **near** the house or **far** from the house?" **Far.**
   - "What is **in front of** the shop?" **The car.** "What is **behind** the shop?" **The teddy.**
2. **Pip gets lost (6 min).** Pip hides somewhere in the town while children cover their eyes (or turn away). The teacher gives one clue: "Pip is **next to** the pond." A child finds Pip. Repeat with clues such as "Pip is **behind** the tree", "Pip is **in front of** the house", "Pip is **far** from the pond" (near the house end). Then a child hides Pip and gives the clue.

✓ Discussion questions (with answers)

- "If Pip is at the house, is the shop near or far?" **Near-ish, or a bit far**; both are fine if the child compares it with the pond: "nearer than the pond".
- "Is the pond near or far?" **It depends: near to what?** Far from the house, but near the end of the mat. Always name the second place.

- "Does 'behind the shop' change if we walk round to the back of the mat?" **Yes, it can.** From the back, the teddy looks in front. That is why we all look from the same side.

✓ Closing check (with answers) (5 min)

Ask three children, one question each:

1. "What is next to the house?" **The tree.**
2. "Is the pond near the house or far from the house?" **Far.**
3. "What is in front of the shop?" **The car.**

Vocabulary

near, far, next to, in front of, behind

Differentiation

- **Needs more support:** only next to and in front of today; the adult points while saying the word.
- **Ready for more:** "Which is nearer to the house, the shop or the pond?" **The shop.** Or the child gives a two-part clue: "next to the pond and in front of it".
- Answers by pointing, signing or moving Pip all count.

⚠ Safety

- Use toys too large to swallow.

Teacher notes and misconceptions

- "Near" and "far" are always "near to something". Children often answer as if from where they sit. Name the second place in every question.
- "In front of" and "behind" depend on where you look from. Keep everyone looking from the front of the mat today. Lesson 2 uses the classroom, where this is harder.
- Take a photo of the town layout so lesson 5 and the one-to-one checks use exactly the same set-up.

Lesson 2: Where is Pip? Clues around the classroom

Back to the unit

Goal

Children follow and give spoken position clues to find a hidden object in the classroom, and use the term 1 classroom map to show where it is.

Materials

- Pip the puppet and one small object to hide (for example a toy key).
- Sticky notes.
- The term 1 classroom picture map, if you still have it (or a quick new one: the teacher draws the room from above with four or five big things on it).

Steps

✎ Opening (5 min)

1. Show the classroom map. "Remember our map? It shows our room from **above**, like a bird sees it." Ask a child to point to the door on the map, then to the real door.
2. "Today Pip has lost a key. We'll use our words to help find it."

✎ Main activity (15 min)

1. **Teacher clues (6 min).** While children cover their eyes or turn away, the teacher hides the key somewhere safe and easy to reach. Give a clue using two position words: "The key is **next to** the sink, **behind** the box." Two or three children look. Then the class finds the spot on the map and the teacher marks it with a sticky note. Do this three times in different places.
2. **Child clues (9 min).** In pairs or small groups with an adult: one child hides the key and gives a clue; the others find it. The adult helps with words if needed ("Is it next to something? In front of something?"). Swap roles.

✓ Discussion questions (with answers)

- "Which clue was easiest to follow?" **Clues that named a big thing we all know** (the sink, the door), plus one position word.
- "Was 'it's over there' a good clue?" **No.** We need to name a place and say next to, in front of or behind it.
- "Why did we mark the spot on the map?" **So someone who was not looking can find it too.** A map helps us tell other people where things are.

✓ Closing check (with answers) (5 min)

Hide the key one last time. Give the clue "next to the door". One child finds it and puts a sticky note on the map next to the door symbol. **Answer:** the key is found by the door, and the sticky note is beside the door on the map.

Vocabulary

clue, map, above, next to, in front of, behind, near, far

Differentiation

- **Needs more support:** clues with one position word only ("next to the sink"). The adult walks with the child.
- **Ready for more:** the child gives a clue using only the map (points to a spot on the map) and a friend finds the real place.
- Children who don't want to search can be the "map keeper" who puts the sticky note on the map.

⚠ Safety

- Hide the key only in safe, low places: not on high shelves, near sinks with hot water, or behind heavy furniture.
- Agree on walking, not running, while searching.

Teacher notes and misconceptions

- "Behind" in a room is tricky: behind the box from where I stand may be in front of it from where you stand. Accept answers that fit one clear way of looking, and say which way: "behind the box, from the door side".
- If a child can't find the key, give a second clue with "near" or "far" ("you're getting near").
- Avoid "left" and "right" clues; they are not taught in this unit.

Lesson 3: Our school walk

Back to the unit

Goal

Children walk round the school grounds, name the places they visit, notice one thing at each place, and start sorting what they see into **made by people** and **natural**.

Materials

- A camera or tablet for the teacher (photograph places, not faces).
- A clipboard with the list of stops.
- Enough adults for your school's ratio rules, and anything your school's risk assessment requires.
- The two sorting hoops for the end of the lesson: **made by people** (brick picture) and **natural** (leaf picture), and about 8 picture cards of things seen at school (see the unit materials list).

Before the lesson

Plan a short route **inside the school grounds** with four stops (five if the route is short), chosen from places such as: our classroom door, the hall, the office, the playground, a garden or tree, and the main gate (looked at from inside). Check that every child can use the route, including wheelchair users, and that there is one quiet stop. Tell the office and anyone you will pass.

Steps

✎ Opening (5 min)

1. "Today we are going on a walk round our school. We will stop at some places. At each stop, look for one thing to remember."
2. Agree the walk rules: walk with your partner, stay with the group, stop when the adult stops.

✎ Main activity: the walk (20 min)

Keep to four stops of about 3 minutes each, leaving time to walk between them. A fifth stop is optional if the route is short.

At each stop:

1. Name the place together: "This is the hall."
2. Ask: "What do you notice here?" Take two or three answers.
3. Ask one position question: "What is **next to** the hall?" or "Is the gate **near** our classroom or **far** from it?" Answers depend on your school; accept answers that match what children can see.
4. The teacher takes one photo of the place (no faces).

5. At the playground or garden, ask: "Can you see something **made by people**? Something **natural**?" (For example a bench and a tree.)

At the gate, look out at the street from **inside** the gate or fence. Ask: "What can we see outside our school?" (cars, a shop, houses, trees). Do not go out.

✓ Discussion questions (with answers)

Back in class (this can run into the closing), children take turns to put a picture card in a hoop and say why:

- "Was the bench made by people or natural?" **Made by people.**
- "The tree?" **Natural.**
- "The flower bed?" **It can be both**: people planted it, but flowers grow by themselves. Saying why is a good answer.
- "Which place was nearest to our classroom?" **The answer depends on your school**; check it against the route.

✓ Closing check (with answers) (5 min)

Each child says one place we visited and one thing they noticed there. **Answers vary**; any place on the route with any real thing seen there counts. A child may point to a photo or picture card, sign, or use a communication device instead of speaking.

Vocabulary

walk, place, stop, made by people, natural, near, far, next to

Differentiation

- **Needs more support:** a partner holds hands or a picture card of the next stop shows where we are going.
- **Ready for more:** at each stop, the child says where it is using two words ("the office is next to the hall, near the gate").
- Children who find the walk tiring or loud can wait at the quiet stop with an adult, or help take the photos.

⚠ Safety

- Stay inside the school grounds. Look at the street from inside the gate or fence.
- Follow your school's rules on adult ratios, risk assessments and permissions. This lesson does not replace them.
- Count children at the start, at each stop and at the end.
- Photograph places, not children, and follow your school's photo policy.

Teacher notes and misconceptions

- Children may name places by what happens there ("where we eat"). That is fine; give the school's name for it too ("the hall").
- Print the photos before lesson 4, one of each stop, large enough to see from the carpet.
- Don't ask children about their way to school or where they live.

Lesson 4: A picture map of a school

Back to the unit

Goal

Children use a simple picture map to find places and say which of two places is nearer to a third, first on Pip's made-up school map and then on a class map of our own school.

Materials

- Pip's school map (see the unit materials list): two rows of picture boxes. Top row, from left: garden, playground, hall. Bottom row, from left: gate, office, classroom.
- A large sheet with the teacher's outline of our school grounds from above (buildings as simple shapes, the playground, the gate).
- The printed walk photos from lesson 3, with sticky tack.
- A marker for the dotted line; paper and crayons for the stretch task.

Steps

✎ Opening (5 min)

1. "Pip goes to a school too. Here is a map of Pip's school, from above." Point to each box and name it.
2. Ask: "Where does Pip go in? Point to the gate." **Bottom row, left-hand box.**

✎ Main activity (15 min)

1. **Pip's school (6 min).** Ask:
    - "Point to the hall." **Top row, right-hand box.**
    - "What is **next to** the playground?" **The garden, the hall and the office** (the office is just below it).
    - "Which is **nearer** to the gate: the office or the classroom?" **The office.**
    - "Which is **far** from the garden: the playground or the classroom?" **The classroom.**
    - "Pip walks from the gate to the classroom. Which place does Pip pass?" **The office.**
2. **Our school map (9 min).** Show the outline of our school. Hold up a walk photo: "Where was this?" Children help stick each photo on the right part of the map. Draw a dotted line between the photos in the order we walked. Add one or two places we did not visit, if children suggest them.

✓ Discussion questions (with answers)

- "Is our map the real school?" **No.** It is a picture from above, and it leaves lots out.

- "Which photo place is nearest to our classroom on the map?" **The answer depends on your school**; check on the map.
- "Could a new child use our map?" **Yes, to find places like the hall or office**, if a grown-up helps.

✓ Closing check (with answers) (5 min)

Using Pip's school map:

1. "Point to the playground." **Top row, middle box.**
2. "Which is nearer to the gate: the office or the classroom?" **The office.**

Vocabulary

map, above, picture map, nearer, next to, far

Differentiation

- **Needs more support:** only point to places on Pip's map; the adult names them.
- **Ready for more:** draw a symbol for a new place (for example a bike rack) and put it on our school map; or answer "Which is nearest to the classroom: the garden, the office or the gate?" on Pip's map (**the office**, which is right next to it).
- Children with low vision can use a tactile version of Pip's map (six boxes with different textures).

⚠ Safety

- None beyond normal classroom care.

Teacher notes and misconceptions

- Keep "next to" on Pip's map simple: boxes that share a side. Diagonal boxes are not "next to" in this lesson.
- Children may think the map is wrong because buildings "don't look like that". Remind them of term 1: a map shows a place from above.
- Keep the class map up for lesson 5.

Lesson 5: Our walk in order, and show what you know

Back to the unit

Goal

Children put photos from the walk in the order we walked, use position words once more, and do a short one-to-one check during the week.

Materials

- The class map with photos from lesson 4.
- A second set of three walk photos (from different stops) per small group.
- The play-mat town, set up exactly as in lesson 1 (use the photo).
- Pip's school map.
- Paper and crayons or pencils for the drawing task.
- A sticker chart for the one-to-one checks.

Steps

✎ Opening (5 min)

1. Look at the class map together. "Where did we go **first**? **Next**? **Last**?" Children point along the dotted line. **Answers follow your walk.**

✎ Main activity (15 min)

1. **Photo order (8 min).** In small groups with an adult, children put three walk photos in the order we walked (first, next, last). They check against the dotted line on the class map.
2. **Draw from memory (7 min).** Each child draws one place from the walk and something next to it. Ask: "What is next to it in your drawing?" Drawings do not need to be accurate; talking about where things are is the point.

✓ Discussion questions (with answers)

- "How did you know which photo came first?" **We remembered the walk, or we checked the dotted line on the map.**
- "Is anything missing from your drawing?" **Yes, always.** Every map or picture from memory leaves things out, and that is fine.
- "What is one place in our school that is far from our classroom?" **Depends on your school**; check on the map.

Closing (5 min)

Explain the check: "This week, each of you will come and show me what you know about where things are." Sing or play a quiet game while the first children start.

One-to-one check (about 3 minutes per child, during the week)

Use the play-mat town, Pip's school map and three walk photos. Record **yes**, **with help** or **not yet** for each part.

1. "What is next to the house?" **The tree.**
2. "Is the pond near the house or far from the house?" **Far.**
3. "What is in front of the shop?" **The car.** "What is behind the shop?" **The teddy.**
4. On Pip's map: "Point to the hall." **Top row, right-hand box.**
5. "Which is nearer to the gate: the office or the classroom?" **The office.**
6. "Put these three photos in the order we walked." **The order of your walk.**

Pointing, signing, moving Pip or a communication device all count as answers. Sit on the same side of the play-mat as in lesson 1 so "in front of" and "behind" mean the same.

Vocabulary

first, next, last, near, far, next to, in front of, behind, map

Differentiation

- **Needs more support:** two photos instead of three; parts 1 to 3 only.
- **Ready for more:** draw a picture map of the play-mat town from above, with every toy in the right place.
- Children who don't want to draw can tell an adult, who writes their words.

⚠ Safety

- Use toys too large to swallow.

Teacher notes and misconceptions

- A drawing of a place from memory is like a "mental map": a person's own picture of a place. Researchers have asked people to sketch their city from memory, and those sketches leave things out too.
- If a child puts photos in a different order but explains it ("we saw the gate when we came back"), check: they may be right about a different part of the walk.

Grade 1 Society: Rules, Fairness and Community Jobs (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 9 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every activity against your school's rules.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the society progression | Grade 1 year plan - Term 1

Big idea

Rules help people stay safe and get along, and different places need different rules. Fair does not always mean everyone gets exactly the same: sometimes it means sharing equally, sometimes taking turns, and sometimes giving someone what they need so they can join in. When a rule is not working, the people who use it can talk and agree a better one. In a town, people do many different jobs: some make things you can hold (goods) and some do things for other people (services), and every job needs skills and tools.

This is the first society unit of grade 1 (term 1). It builds on the kindergarten unit My day and my class (classroom roles, making one class rule with a "so that..." reason) and on Families, then and now, and people who help us (helpers in school and town). Here the rules move outside the classroom, the idea of fairness is added, and jobs are sorted and explained.

Outcomes

By the end of the unit most children can:

1. Match a rule to a place (a park, a library, a swimming pool, a road crossing, a bus, a café kitchen) and give its reason with "so that...".
2. Show a fair share of a small number of objects between two people, and explain one time when fair means taking turns.
3. Explain, using a story, that fair can also mean giving someone what they need to join in, even when others do not get the same thing.
4. Say what was wrong with a rule that was not working in a game, help their group agree a better rule, and say whether it worked better.
5. Sort made-up job cards into "makes a thing you can hold" (goods) and "does something for people" (services), and name one tool and one skill a job needs.
6. Work with a group on a shared task, sharing out the roles in a fair way.

Prior knowledge

- Kindergarten society: our day in order, classroom roles and jobs, making a class rule and saying why, helpers in school and town.
- Kindergarten health and PE: taking turns, stop/look/listen with a grown-up.
- Grade 1 maths term 1 runs alongside: sharing 10 counters into two equal groups uses facts within 20.

- No reading is needed. Every rule, place, job and tool card has a picture; words on cards are for the adult.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week. Lesson 3 needs the hall, playground or a cleared space. Lesson 5 can take two sessions if groups want more time to build.

Lesson	Title	Main activity
1	Rules in different places	Match rule cards to place cards and give "so that..." reasons
2	What is fair?	Share counters, take turns with a timer, the story of the step, fair and unfair ways to choose
3	When a rule isn't working	Play a beanbag game with an unfair rule, agree a better rule, play again
4	Jobs in Little Hill	Sort made-up job cards into goods and services; match tools and skills
5	Building Little Hill together	Groups build one building and a rule sign for a class town; show what you know

Materials (whole class unless noted)

- Lesson 1: per pair, a set of 6 place picture cards (park playground, library, swimming pool, road crossing, bus, café kitchen), a set of 14 rule picture cards (listed in lesson 1) and a sorting mat with 6 boxes; large copies of the place cards for the board; a museum place card for the closing check.
- Lesson 2: per pair, 10 counters and 2 paper cups; per group of 4, one toy and a 1-minute sand timer; story picture cards A-D (Kit and Ari); per pair, 6 "ways to choose" cards and a mat with a thumbs-up box and a thumbs-down box; a cup of numbered lolly sticks; for the closing check, 8 stickers or counters and a picture of two children; large counters for any child who still mouths small objects.
- Lesson 3: per group of 4, one hoop, one beanbag, one yellow bib (or sash) and a strip of floor tape for the throwing line (about 2 metres from the hoop); the cup of numbered lolly sticks from lesson 2; the "Class Fox line leader" story card; a large "Our new rule" sheet and a pen; the "paint table" picture card for the closing check. Indoor alternative per group: a cardboard box and a scrunched paper ball.
- Lesson 4: per pair, 8 made-up job cards (baker, bus driver, nurse, librarian, farmer, bin collector, builder, hairdresser), a sorting mat ("makes a thing you can hold" with a picture of hands holding a loaf; "does something for people" with a picture of a helping hand), and 8 tool cards (oven, tractor, steering wheel, stethoscope, comb and scissors, bin lorry, bricks and trowel, library computer); a banana (or a picture of one) and a picture of a lorry and a ship; two closing-check cards (dentist, potter).
- Lesson 5: per group of 4, 3-4 clean empty cardboard boxes, paper, crayons, glue sticks, masking tape, child-safe scissors, a lolly stick and a small card for a rule sign, 4 group role cards (builder, decorator, sign maker, checker) and one building card (bakery, bus stop, library, clinic, farm shop, hair salon or bin depot); a long paper strip as the town street; the "ways to choose" cards and the cup of numbered lolly sticks from lesson 2; pre-cut shapes, glue dots and tape tabs for fine-motor support; the cards needed for the one-to-one check (see Assessment).
- Blank cards and pencils for the extensions in lessons 1 and 4.

- Support cards: two ready-made new-rule picture cards per group (lesson 3); two ready-drawn rule signs per group and a thumbs-up card for the checker (lesson 5).

Assessment

- Lessons 1-4: the teacher notes answers in the closing checks (observe; no writing needed). Children can answer by speaking, signing, pointing or choosing a picture card.
- Lesson 5: watch how each group shares out roles and decides, and listen to each group's rule and "so that..." reason.
- End-of-unit one-to-one check (about 4 minutes per child; plan extra small-group time in the week, as 40 minutes is not enough for a whole class). Materials: the swimming pool card and "walk, don't run" rule card, 6 counters and 2 cups, story card C, the baker and bus driver job cards, a picture of a game where one child always goes first. Answer guide:
    1. "Why might a swimming pool have a 'walk, don't run' rule?" (So that nobody slips on the wet floor and gets hurt.)
    2. "Share these 6 counters fairly between Kit and Ari." (3 each.)
    3. Story card C. "Ari gets a step to reach the sink. Kit doesn't need one. Is that fair?" (Yes, because Ari needs it so that both can wash their hands. If a child says "no, it's not the same", ask: "Can Ari wash hands without it?" and accept a changed answer with a reason.)
    4. Baker and bus driver cards. "Which one makes a thing you can hold?" (The baker: bread, cakes.) "What does the other one do for people?" (Drives people where they need to go.)
    5. Picture of a game where one child always goes first. "Is this rule working for everyone? What could the group change?" (No; take turns, pick a lolly stick, or any fair way that gives everyone a go.)
- There is no validated pass mark. The check covers the main ideas, not every skill in the unit.

⚠ Safety (read before lesson 1)

- Lesson 3 is a moving game: clear the space, agree a "hands up, everything stops" signal, throw underarm only, towards the hoop and never at people. Fetch the beanbag only when the thrower has finished.
- Lesson 5: child-safe scissors only; use clean, empty food boxes and leave out any packaging from foods on the class allergy list (for example nut products).
- Counters, lolly sticks and stickers stay on tables and out of mouths; use large counters with any child who still mouths objects.

Families, feelings and privacy

- All stories use made-up children (Kit and Ari, Class Fox) and a made-up town (Little Hill). Never ask children what jobs the grown-ups at home do, what money their family has, or whether their family follows a rule.
- Children can share a job they would like to do, or a job they have seen in a story, if they want to; nobody has to.
- In lesson 2, keep "fair means giving what someone needs" about Kit and Ari. Do not point to real children in the class who use a step, a chair, a hearing aid or any other support.

- Show jobs done by people of different genders, ages and appearances. Avoid saying any job is for boys or for girls.

Access and taking part

- Every card has a picture, so no child needs to read.
- Children may answer by speaking, signing, pointing, choosing a card or using a communication device. Give extra waiting time.
- Children who do not want to speak to the class can tell a partner or the adult, or hold up a card.
- Lesson 3: a child who uses a wheelchair or walking frame throws from where they are, and the throwing line moves to them; children who prefer not to join the active game can be the group's "rule watcher", who says whether the rule is being followed. Seated players can throw a paper ball into a box on a table instead.
- Low vision: large cards with bold outlines; describe each card aloud. Fine-motor needs in lesson 5: pre-cut shapes, glue dots and tape tabs.
- Colour is never the only clue: the sorting mats use picture symbols (thumbs up and down, hands holding a loaf, a helping hand).

Sources

- College, Career, and Civic Life (C3) Framework for Social Studies State Standards, NCSS, 2013, read via an Internet Archive snapshot of the publisher's PDF (PDF pages 32-34 for civics, page 37 for economics). The unit uses these K-2 indicators, each checked word for word in that PDF:
  - D2.Civ.1.K-2 "Describe roles and responsibilities of people in authority." (the lifeguard in lesson 1; the teacher in lesson 3)
  - D2.Civ.2.K-2 "Explain how all people, not just official leaders, play important roles in a community." (lessons 4 and 5)
  - D2.Civ.3.K-2 "Explain the need for and purposes of rules in various settings inside and outside of school." (lesson 1)
  - D2.Civ.6.K-2 "Describe how communities work to accomplish common tasks, establish responsibilities, and fulfill roles of authority." (lesson 5)
  - D2.Civ.8.K-2 "Describe democratic principles such as equality, fairness, and respect for legitimate authority and rules." (lesson 2)
  - D2.Civ.9.K-2 "Follow agreed-upon rules for discussions while responding attentively to others when addressing ideas and making decisions as a group." (lessons 3 and 5)
  - D2.Civ.12.K-2 "Identify and explain how rules function in public (classroom and school) settings." (lesson 3)
  - D2.Eco.3.K-2 "Describe the skills and knowledge required to produce certain goods and services." (lesson 4)
  - D2.Eco.4.K-2 "Describe the goods and services that people in the local community produce and those that are produced in other communities." (lesson 4)
- Alignment is limited to these named indicators; the whole framework was not reviewed, and no official endorsement is claimed.

Known gaps and cautions

- Rules, places and jobs differ between countries and towns. Swap the cards for places and jobs children know, and use your local road-crossing rule (for example, a green figure, or no signal at all).

- Some jobs fit both columns (a builder makes a house you can see and touch, but also does a service for the family who asked; a café cook makes food and serves it). Accept any placement a child can explain; the cards were chosen so most have one clear answer.
- "Fair" is a big idea that adults disagree about. These lessons show three everyday kinds (equal shares, taking turns, giving what someone needs) and do not claim this is the whole story.
- The game in lesson 3 has a deliberately unfair first rule. Keep the first round short (about 3 minutes) so no child feels left out for long, and rotate who wears the bib between groups, choosing in a fair way.
- Money, prices and saving (later C3 economics indicators) are left for grade 2. Laws and governments are left for grade 2 and later.
- Pacing and vocabulary load are untested estimates; a qualified local educator should review the unit before classroom use.
- Gemini 4 Argon text-checked the README and lessons 1-5 at 032dbc6 on 9 November 2026 (timings, links, counts, sources, safeguards and the one-to-one check were consistent); two materials notes were fixed in 00cf8e7, which Argon also diff-checked the same day (see PEERCHECKS.md). This is a peer check by an AI agent, not an educator review.
- The order of lessons, the activities and the timings are my choice, not taken from a source.

Lesson 1: Rules in different places

Unit overview - Next: Lesson 2

Goal: Children match rules to the places that need them and say why each rule helps, using "so that...".

Length: about 40 minutes.

Materials

- Per pair: 6 place picture cards (park playground, library, swimming pool, road crossing, bus, café kitchen); a sorting mat with 6 boxes, one for each place; 14 rule picture cards:
  - Park: "Wait your turn for the slide"; "Put litter in the bin".
  - Library: "Use a quiet voice"; "Turn pages gently".
  - Swimming pool: "Walk, don't run"; "Swim only when the lifeguard is there".
  - Road crossing: "Stop, look and listen with a grown-up"; "Cross when the green figure shows".
  - Bus: "Stay sitting while the bus moves"; "Let people get off first".
  - Café kitchen: "Wash hands before cooking"; "Keep hot pans away from the edge".
  - Everywhere: "Be kind"; "Ask a grown-up for help".
- Large copies of the 6 place cards for the board.
- A museum place card for the closing check.
- Blank cards and pencils for the extension (drawing a new rule card).

Steps

✎ Opening (5 min)

Recall the kindergarten class rule: "Last year your class made a rule. What was it for?" Accept any answer with a reason. Say: "Rules are not only for classrooms. Today we visit six places and find the rules each one needs." Put the large place cards on the board and name each one together.

✎ Main activity (25 min)

1. **Model (5 min).** Take the swimming pool card. Hold up "Walk, don't run". "Where does this rule belong? Why?" Think aloud: "The floor is wet, so that nobody slips and gets hurt." Put it in the pool box. Point out the lifeguard in the picture: "The lifeguard's job is to watch the water and make sure people stay safe."
2. **Pairs match (12 min).** Pairs place the rule cards in the boxes. Walk round and ask "Why does it go there?" Two cards ("Be kind", "Ask a grown-up for help") fit everywhere: pairs put them under the mat.
3. **"So that..." round (8 min).** Each pair chooses one rule and says it with a reason: "In the library we use a quiet voice so that people can read and think." Children who prefer not to speak to the class tell the adult or hold up the card while their partner speaks.

✓ Discussion questions (5 min, with answers)

1. "The library has a quiet-voice rule. Why doesn't the park have one?" (People in a library are reading and thinking; in the park, loud play usually doesn't stop anyone else from doing what they came for.)
2. "Which rules fit in lots of places?" (Be kind, ask for help, taking turns, putting litter in the bin, washing hands before food; accept others with a reason.)
3. "Who helps people keep the rules at the pool?" (The lifeguard. Other places: the bus driver, the librarian, the crossing guard, the cook in charge.)

✓ Closing check (5 min, with answers)

Show the museum card. "Here is a new place. Think of one rule a museum might need and say 'so that...'." (Any rule with a reason, for example: "Don't touch the things in the glass cases so that they don't break"; "Walk so that nobody bumps into the displays"; "Use a quiet voice so that people can listen to the guide.") Note who gives a rule with a reason.

Vocabulary

rule, reason, "so that", place, safe, lifeguard, librarian.

Differentiation

- Support: give a pair only 3 places and 6 rule cards; say each card aloud.
- Extension: "Make up a new rule for one of the places and draw its card." Or: "Find a rule that would be silly in another place." (A quiet-voice rule in the playground.)

⚠ Safety

- None beyond normal classroom care. Remind children that the road crossing rule is "with a grown-up" (kindergarten road safety).

Teacher notes

- Use local versions: if your crossings have no green figure, change that card to your local rule.
- Keep the talk on the made-up places. Do not ask children whether their family follows a rule.

Lesson 2: What is fair?

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children learn three everyday kinds of fair (equal shares, taking turns, giving someone what they need to join in) and sort fair and unfair ways to choose who goes first.

Length: about 40 minutes.

Materials

- Story picture cards A-D about two made-up children, Kit and Ari:
  - A: Kit and Ari with a plate of 10 grapes.
  - B: Kit and Ari next to one swing.
  - C: Ari, too short to reach the sink, standing on a step; Kit, tall enough, without one; both washing their hands.
  - D: Kit and Ari with a board game, both wanting to go first.
- Per pair: 10 counters (the "grapes") and 2 paper cups labelled with pictures of Kit and Ari.
- Per group of 4: one toy (the "swing") and a 1-minute sand timer.
- Per pair: 6 "ways to choose" cards and a mat with a thumbs-up box and a thumbs-down box. The cards: "Take turns from a list"; "Pick a numbered lolly stick from a cup"; "Rock, paper, scissors"; "The tallest always goes first"; "Whoever shouts loudest goes first"; "The same child always goes first".
- A cup of numbered lolly sticks for the demonstration.
- For the closing check: 8 stickers or counters and a picture of two children.
- Large counters for any child who still mouths small objects.

Steps

✎ Opening (5 min)

Show card A. "Kit and Ari have 10 grapes. Kit takes 8 and gives Ari 2. Is that fair?" (No.) "What would be fair?" Take ideas. Say: "Today we find out what fair means. It is not always the same thing."

✎ Main activity (25 min)

1. **Equal shares (6 min).** Pairs share the 10 counters between the Kit cup and the Ari cup, one at a time ("one for Kit, one for Ari"). Count: 5 and
2. "Fair can mean the same amount each." Quick try: 6 counters (3 each).
3. **Taking turns (6 min).** Show card B. "There is only one swing. We can't cut it in half! What's fair?" (Take turns.) Groups of 4 pass the toy round, each child holding it until the 1-minute sand timer runs out. "Fair can mean everyone gets a turn."
4. **The story of the step (6 min).** Show card C and tell it: "Ari can't reach the sink, so the teacher gives Ari a step. Kit is tall enough and doesn't get a step. Is that fair?" Take ideas from both sides. Then ask: "Could Ari wash hands without the step?" (No.) "Now both can wash their hands. Fair can mean giving someone what they need so they can join in."

5. **Ways to choose (7 min).** Show card D. "Who goes first?" Demonstrate one fair way: pull a numbered stick from the cup. Pairs sort the 6 "ways to choose" cards onto thumbs up (fair) and thumbs down (not fair).

✓ Discussion questions (5 min, with answers)

1. "Why is 'the tallest always goes first' not fair?" (The same person always wins, and nobody can change how tall they are.)
2. "Why is picking a lolly stick fair?" (Everyone has the same chance; nobody knows which stick they will get.)
3. "When we shared the grapes, everyone got the same. When Ari got the step, Kit did not get the same. Were both fair?" (Yes: the grapes were shared equally, and the step helped Ari do what Kit could already do.)

✓ Closing check (5 min, with answers)

1. Put 8 stickers next to the picture of two children. "Show me a fair share." (4 each.)
2. "Tell me one fair way to choose who goes first." (Take turns from a list, pick a lolly stick, rock paper scissors, or another way where everyone has the same chance.)

Note who shares equally and who names a fair way.

Vocabulary

fair, not fair, share, the same, turn, need.

Differentiation

- Support: share 4 counters (2 each) before 10; sort only 4 "ways to choose" cards (2 fair, 2 not fair).
- Extension: "Share 9 grapes between Kit and Ari. What can you do with the one left over?" (Cut it in half, give it to someone else, save it; accept any idea with a reason.) Or invent a new fair way to choose.

⚠ Safety

- Counters and lolly sticks stay on tables, out of mouths; use large counters with any child who still mouths objects.
- The "swing" is a toy passed hand to hand; no real swinging.

Teacher notes

- Keep the step story about Kit and Ari. Do not point to real children in the class who use a step, a chair, a hearing aid or other support.

- Some children will say the step is not fair because it is not the same. That is a reasonable first answer; the question "Could Ari wash hands without it?" usually helps. Accept a changed answer with a reason.
- Rock, paper, scissors gives each player the same chance only if both show their hand at the same time; mention this if children raise it.

Lesson 3: When a rule isn't working

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children notice when a rule is not working for everyone, agree a better rule as a group by listening to each other, and test whether the new rule works better.

Length: about 40 minutes. Teach in the hall, the playground or a cleared classroom.

Materials

- The "Class Fox line leader" story card: a made-up class where the first child to reach the door is the line leader, showing children rushing to the door.
- Per group of 4: one hoop, one beanbag, one yellow bib (or sash), and a strip of floor tape for the throwing line about 2 metres from the hoop.
- Indoor alternative per group: a cardboard box and a scrunched paper ball.
- A large "Our new rule" sheet and a pen.
- The "paint table" picture card for the closing check (only the children at the front table can use the paint; children at other tables are waiting).
- A cup of numbered lolly sticks (from lesson 2) for choosing who wears the bib first.
- For support: two ready-made new-rule picture cards per group (for example "Everyone takes a turn wearing the bib" and "Throw in the order of the lolly sticks").

Steps

✎ Opening (5 min)

Agree the stop signal: "When I put my hand up, everything stops and you put your hand up too." Practise once. Recall lesson 2: "What does fair mean?" (Sharing the same, taking turns, giving what someone needs.)

✎ Main activity (25 min)

1. **Class Fox (6 min).** Show the story card. "In Class Fox, the first child to reach the door is line leader. What happens?" (Children run and push; the fastest children are always leader; slower children never are.) "Is this rule working?" (No.) "What could Class Fox change?" Write ideas on the "Our new rule" sheet (a turns chart; a lolly stick each morning). "The people who use a rule, with the teacher, can agree to change it."
2. **Game, round 1 (4 min).** Groups of 4 at a hoop. Use the lolly sticks to choose who wears the yellow bib. Rule 1: "Only the player in the yellow bib throws, every time. The others fetch the beanbag." Throw underarm from the line into the hoop. Stop after about 3 minutes.
3. **Agree a better rule (6 min).** Groups sit together. Ask: "Was rule 1 fair? How did it feel to only fetch?" Each child says one idea while the others listen; the group agrees one new rule (for example: pass the bib on after each throw; take turns round the circle). Groups can agree by talking, by a show of hands, or by picking a lolly stick if two ideas are tied.
4. **Game, round 2 (5 min).** Play again with the new rule.

5. **Back together (4 min).** Each group shows its new rule with a thumbs up (worked better), thumbs sideways (a bit better) or thumbs down (not better), and says why if they want to.

✓ Discussion questions (5 min, with answers)

1. "What was the problem with rule 1?" (The same child threw every time; the others only fetched. It was not fair, and it was not much fun for most of the group.)
2. "How did your group choose the new rule?" (We each said an idea, listened and agreed, or put our hands up, or picked a stick.)
3. "Who can change a rule?" (The people who use it, working together and with the person in charge, such as the teacher for class rules.)

✓ Closing check (5 min, with answers)

Show the paint table card. "The rule is: only children at the front table can use the paint. Is it working for everyone?" (No: the other tables never get to paint.) "What could the class change?" (Take turns by table; put paint on every table; use a turns chart.) Note who sees the problem and who suggests a fairer rule.

Vocabulary

rule, change, agree, listen, fair, better.

Differentiation

- Support: offer two new rules on picture cards and let the group choose one.
- Extension: "Your new rule worked. Could it be even better? What else might go wrong?" (For example: someone throws too hard, so add "underarm only".)

⚠ Safety

- Clear the space; groups well apart. Throw underarm, towards the hoop, never at people. Fetch the beanbag only after the throw.
- Use the stop signal before every change of round.

Access

- A child who uses a wheelchair or walking frame throws from where they are; move the throwing line to them.
- A child who prefers not to join the active game can be the group's "rule watcher", who says whether the rule is being followed, and has a full say in the new rule.
- Seated players can throw a scrunched paper ball into a cardboard box on a table.

Teacher notes

- Keep round 1 short (about 3 minutes) so nobody feels left out for long. Rule 1 is unfair on purpose; say so afterwards.
- Most groups will choose turns. If a group's new rule doesn't work, that is useful: "What would you change next time?"

Lesson 4: Jobs in Little Hill

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children sort jobs in a made-up town into those that make things you can hold (goods) and those that do something for people (services), and say what tools and skills a job needs.

Length: about 40 minutes.

Materials

- Per pair: 8 made-up job cards from the town of Little Hill: baker, bus driver, nurse, librarian, farmer, bin collector, builder, hairdresser. Show people of different genders, ages and appearances.
- Per pair: a sorting mat with two boxes: "makes a thing you can hold" (picture: hands holding a loaf) and "does something for people" (picture: a helping hand).
- Per pair: 8 tool cards: oven, tractor, steering wheel, stethoscope, comb and scissors, bin lorry, bricks and trowel, library computer.
- A banana (or a picture of one) and a simple picture of a lorry and a ship.
- Two closing-check cards: a dentist and a potter.
- Blank cards and pencils for the extension (drawing a new job card).

Steps

✎ Opening (5 min)

"Little Hill is a made-up town. Lots of people work there. Who might work in a town?" Take ideas (from stories, from walking around). Say: "Today we find out what each job does for the town."

✎ Main activity (25 min)

1. **Goods or services (8 min).** Model with the baker: "The baker makes bread. Can you hold bread?" (Yes.) "Things you can hold are called goods." Then the bus driver: "Can you hold what a bus driver does?" (No; the driver takes people places.) "When someone does something for people, it is called a service." Pairs sort the 8 job cards.
2. **Tools (7 min).** Pairs put a tool card next to each job. Check together: baker - oven; farmer - tractor; bus driver - steering wheel; nurse - stethoscope; hairdresser - comb and scissors; bin collector - bin lorry; builder - bricks and trowel; librarian - library computer.
3. **Skills (5 min).** "What does a baker need to know or be good at?" (How to mix and measure, how hot the oven is, how long to bake, washing hands.) Pairs choose one other job and tell each other one thing that person needs to know or be good at. Share two or three.
4. **From far away (5 min).** Hold up the banana. "Can bananas grow in Little Hill's cold winters?" (No.) "Bananas grow in warm places. Farmers there grow them, and lorries

and ships bring them here. Some goods are made in our town, and some come from other places."

✓ Discussion questions (5 min, with answers)

1. "Is the nurse making something you can hold?" (No; the nurse looks after people who are ill or hurt. That is a service.)
2. "Which job would Little Hill miss most if it stopped for a week? Why?" (Any answer with a reason, for example: the bin collectors, because rubbish would pile up and smell. Point out that every job matters to someone.)
3. "The builder makes a house you can touch. Is that goods or a service?" (It could be both: the house is a thing, and building it is something done for the people who asked. Accept either with a reason.)

✓ Closing check (5 min, with answers)

Show the two new cards one at a time. "Does this person make a thing you can hold, or do something for people?"

1. Dentist. (Does something for people: looks after teeth. A service.)
2. Potter. (Makes a thing you can hold: bowls, cups, pots. Goods.)

Note who sorts both correctly and who can say why.

Vocabulary

job, goods, service, tool, skill, make, town.

Differentiation

- Support: sort 4 job cards only (baker, farmer, bus driver, nurse); say each card's name aloud.
- Extension: "Make a new job card for Little Hill. Draw the tool it needs and say whether it makes goods or a service."

⚠ Safety

- None beyond normal classroom care. If you bring a real banana, check the class allergy list; do not eat it in the lesson.

Teacher notes

- Never ask what jobs the grown-ups at home do. Children may say a job they would like to do, or one from a story, if they want to.
- Avoid saying any job is for boys or for girls; if a child says so, ask: "Could anyone learn to do that job?"

- The builder card is deliberately tricky (see discussion question 3). Every other card has one clear answer: goods - baker, farmer, builder (usually); services - bus driver, nurse, librarian, bin collector, hairdresser.

Lesson 5: Building Little Hill together

Unit overview - Previous: Lesson 4

Goal: Children work in a group on a shared task, share out roles in a fair way, and make a building and a rule sign for a class model of Little Hill. The end-of-unit one-to-one check runs during the week.

Length: about 40 minutes (can take two sessions).

Materials

- Per group of 4: 3-4 clean, empty cardboard boxes; paper; crayons; glue sticks; masking tape; child-safe scissors; a lolly stick and a small card for a rule sign.
- Per group: 4 role cards with pictures (builder: puts the boxes together; decorator: draws windows and doors; sign maker: makes the rule sign; checker: checks the group is following its plan and everyone is joining in) and one building card (bakery, bus stop, library, clinic, farm shop, hair salon or bin depot).
- The "ways to choose" cards from lesson 2 and a cup of numbered lolly sticks.
- A long paper strip on the floor or a table as the town street.
- For fine-motor support: pre-cut shapes, glue dots and tape tabs.
- For support: two ready-drawn rule signs per group to choose from, and a thumbs-up card the checker can hold up.
- For the one-to-one check during the week: the swimming pool card and the "walk, don't run" rule card (lesson 1), 6 counters and 2 cups, story card C (lesson 2), the baker and bus driver job cards (lesson 4), and a picture of a game where one child always goes first.

Steps

✎ Opening (5 min)

"Today our class builds Little Hill together. Each group makes one building and one rule sign. A town only works when lots of people do different jobs, and your group only finishes if everyone does a job too." Show the role cards and the building cards.

✎ Main activity (25 min)

1. **Share out the roles (4 min).** Each group chooses a fair way from the "ways to choose" cards to share out the 4 role cards (for example, pick a lolly stick, then choose roles in number order). Groups of 3 combine decorator and sign maker; groups of 5 have two builders.
2. **Build (15 min).** Groups build their building from boxes and make a rule sign that belongs to their place (for example, the bakery: "Wash hands before baking"; the bus stop: "Wait in a line"). The sign maker draws the rule; the whole group agrees its "so that..." reason.
3. **Our street (6 min).** Groups place their buildings on the town street. Walk along it together; each group points to its rule sign.

✓ Discussion questions (5 min, with answers)

1. "How did your group decide who did which role?" (We used a fair way: picked sticks, took turns, or talked and agreed.)
2. "What would happen if everyone in your group made the sign and nobody built?" (The building wouldn't get finished. Sharing jobs helps a group finish a shared task, like jobs in a town.)
3. "What does our town still need?" (Any building with a reason, for example: a school, a park, a fire station.)

✓ Closing check (5 min, with answers)

Each group says its rule with "so that...". (Any rule that fits the place, with a reason that explains how it helps, for example: "Wait in a line at the bus stop so that everyone gets on safely and in turn.") Note groups whose reason links to safety, fairness or getting along.

End-of-unit one-to-one check

Run the five-question check in the unit overview (Assessment section) during the week, about 4 minutes per child, while other children add to the town or draw a job they might like to do (by choice; nobody has to).

Vocabulary

group, role, share, agree, town, street.

Differentiation

- Support: give the group a ready-drawn rule sign to choose from (two choices); pre-cut windows and doors.
- Extension: add a second sign, or make a job card for someone who would work in their building and say whether it is goods or a service.

⚠ Safety

- Child-safe scissors only; cut away from fingers and bodies.
- Use clean, empty food boxes; leave out packaging from foods on the class allergy list (for example nut products).

Access

- Every role can be done in different ways: a checker can use a thumbs-up card; a sign maker can choose a picture instead of drawing.
- Fine-motor needs: pre-cut shapes, glue dots and tape tabs.
- Children may give the rule and reason by speaking, signing, pointing to the sign or with a partner speaking for them.

Teacher notes

- The checker role is not a boss: it means checking the plan and that everyone joins in. Say this when handing out cards.
- Keep the town for a week so children can add to it during the one-to-one checks.

Grade 1 Society: Then and Now: Timelines and Old and New Objects (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 9 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every activity against your school's rules.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the society progression | Grade 1 year plan - Term 2

Big idea

Things happen in an order, and we can show that order on a timeline using words like first, next, before, after, long ago and now. Life in the past was different from life today in some ways and the same in others: children long ago also learned, played and helped, but many of their tools and toys were different. We find out about the past from sources: old objects, old pictures, written labels and what older people remember. A source can answer some of our questions, and it can also make us think of new ones.

This is the second society unit of grade 1 (term 2). It builds on the kindergarten unit Families, then and now, and people who help us (sorting "long ago" and "now", three time bands, what an old photo can and cannot tell us). Grade 1 adds longer sequences, before/after language, comparing a whole part of life (school) then and now, and asking questions of a source.

Outcomes

By the end of the unit most children can:

1. Put five picture cards of a made-up story in time order and talk about them with first, next, then, last, before and after.
2. Compare a picture of a made-up classroom from long ago with a classroom now, and say one thing that changed and one thing that stayed the same.
3. Sort old and new versions of everyday objects (phones, music players, keys, toys) onto a three-part timeline (long ago, when today's grown-ups were small, now) and give one clue for each choice.
4. Name at least two kinds of source (an object, a picture, a written label, what a person remembers) and say one thing a source can tell us.
5. Find who made an object, where and roughly when from a museum-style label read aloud by an adult, and ask one question about the object.

Prior knowledge

- Kindergarten society term 2: "long ago" and "now"; three time bands; old photos as clues.
- Grade 1 society term 1: working in pairs and groups, sharing roles fairly.
- Grade 1 mathematics term 1: counting and ordering to 20, used for numbering timeline cards.

- No reading is needed. Every card has a picture; words on cards are for the adult.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week.

Lesson	Title	Main activity
1	What comes first? Making a timeline	Order a school day and the story of Rosa growing up on a washing-line timeline
2	A classroom long ago and now	Compare two classroom pictures; sort changed and stayed the same
3	Old and new objects	Sort phones, music players, keys and toys onto a three-part timeline, giving clues
4	Museum detectives	Kinds of sources; read museum labels for maker, place and date; ask questions
5	Our Little Hill timeline	Listen to a memory (a visitor or the Mrs Okafor story), build a class timeline, show what you know

Materials (whole class unless noted)

- Lesson 1: a string "washing line" across the board with pegs; 6 large school-day cards (arriving at school, morning story, maths, lunch, outdoor play, going home); per pair, 5 "Rosa grows up" cards (baby, crawling, first steps, starting kindergarten, in grade 1) and a 5-box number strip (1 to 5); per pair, 3 sunflower cards (seed, sprout, flower) for the closing check; blank cards and pencils for the extension; per pair, 3 "Rosa grows up" cards (baby, first steps, in grade 1) for the support group.
- Lesson 2: two large classroom pictures (Little Hill School long ago and now; see lesson 2); per pair, a set of 8 small detail cards and a sorting mat with three boxes ("long ago", "now", "both"), each box with a picture symbol (an old clock, a sun, two linked hands); a real slate (or a picture) and a small whiteboard for the closing check; magnifying glasses (optional).
- Lesson 3: three large time-band cards (long ago, when grown-ups were small, now), each with a symbol (an old clock, a younger grown-up, a sun); per group of 4, 12 object picture cards (listed in lesson 3); per group, a "clue" card set (material, wires or batteries, screen, worn or new); a big iron key picture and a key card for the closing check. Optional: a museum or library loan box of real old objects (see Safety).
- Lesson 4: four large "source" cards (an object, a picture, a written label, a person remembering); per pair, 3 museum label cards with a picture (listed in lesson 4); a "question words" card (who, what, where, when, why, how) with a picture for each; a spinning-top label card for the closing check; a large sheet of paper and a marker for the class questions (kept for lesson 5); blank cards and pencils for the extension.
- Lesson 5: the three time-band cards from lesson 3 on a long strip; the 12 object cards from lesson 3 (one set) plus 6 Little Hill picture cards (listed in lesson 5); the class question sheet from lesson 4; the Mrs Okafor memory card (made up, read by the adult) or an agreed visitor; masking tape or Blu-tack, a sticky note and pen; the lesson 3 clue cards for the support group; the stove and hand bell detail cards from lesson 2 (for Access); the cards needed for the one-to-one check (see Assessment).
- For tactile or low-vision access: large, bold-outline versions of every card; for lessons 3 and 5, real objects or raised-outline cards for at least one set (for example the keys) where possible.

Assessment

- Lessons 1-4: the teacher notes answers in the closing checks (observe; no writing needed). Children can answer by speaking, signing, pointing or choosing a picture card.
- Lesson 5: watch how each child places a card on the class timeline and listen for a clue or a question.
- End-of-unit one-to-one check (about 4 minutes per child; plan extra small-group time in the week, as 40 minutes is not enough for a whole class). Materials: the 5 "Rosa grows up" cards, the two classroom pictures from lesson 2, the three phone cards from lesson 3, the spinning-top label card from lesson 4. Answer guide:
    1. "Put Rosa's pictures in order." (Baby, crawling, first steps, starting kindergarten, in grade 1.) "What happened just before Rosa started kindergarten?" (First steps.)
    2. Classroom pictures. "Tell me one thing that is different now and one thing that is the same." (Different: for example slates and chalk now whiteboards or tablets, a stove now radiators, long rows of desks now tables in groups. Same: for example children learning, reading, a teacher, playing outside.)
    3. Phone cards. "Put these phones on the timeline: long ago, when grown-ups were small, now. Tell me one clue." (Candlestick phone, wall phone with a cord, smartphone. Clues: shape, wires and cords, buttons or a dial, a screen.)
    4. "How can we find out about long ago?" (Any two kinds of source: old objects, old pictures or photos, labels or writing, asking older people.)
    5. Spinning-top label card, read by the adult. "Who made it? Where? About how long ago?" (A toymaker; in Little Hill; about 100 years ago.) "What would you like to ask about it?" (Any question about the object, for example "Who played with it?" or "How does it spin?")
- There is no validated pass mark. The check covers the main ideas, not every skill in the unit.

⚠ Safety (read before lesson 1)

- If you use real old objects: only objects from a school, museum or library loan box that the lender says are safe to handle. Leave out anything sharp, heavy, glass, electrical, with old batteries, or with peeling or flaking paint (old paint can contain lead). Handle over a table with two hands; no taking apart. Everyone washes hands after handling old objects.
- Washing-line pegs and string: the line is fixed at adult height on the board; children hand cards to the adult or peg them while standing.
- Small objects stay on tables and out of mouths.

Families, feelings and privacy

- Every person in this unit is made up (Rosa, Mrs Okafor, the children in the Little Hill School pictures) and the town is the made-up Little Hill from term 1.
- Never ask children to bring photos or objects from home, to say how old their relatives are, or to describe their home, their family's history or how their family lives. Children who want to tell you about something from home can do so; nobody has to.
- Some children have no baby photos, have moved home or country, or live apart from family. Rosa's timeline is about a made-up child for this reason; do not ask children to make their own life timeline in this unit.

- The lesson 5 visitor is optional. If you invite one, choose an adult the school already knows (for example a retired staff member or a regular volunteer), agree with them beforehand what they will talk about, and tell families in advance. If no visitor is possible, use the Mrs Okafor memory card; the lesson works the same way.
- Show people of different ages, genders, abilities and appearances in the pictures, long ago and now. Avoid saying that life long ago was simply "worse" or "better": say what was different.

Access and taking part

- Every card has a picture, so no child needs to read.
- Children may answer by speaking, signing, pointing, choosing a card or using a communication device. Give extra waiting time.
- Children who do not want to speak to the class can tell a partner or the adult, or hold up a card.
- Low vision and blind children: large, bold-outline cards described aloud; in lessons 3 and 5, a real object or raised-outline card for at least one object family, so the child can sort by touch (heavy iron key, small metal key, flat plastic key card).
- Children who cannot reach the washing line hand their card to an adult or a partner and say or point where it goes.
- Colour is never the only clue: the sorting mats and time-band cards use picture symbols (an old clock, a younger grown-up, a sun, two linked hands).
- Deaf children: face the class when telling the story; in lesson 5 the visitor (or adult reading the memory card) speaks facing the children and uses the picture cards as they speak; use the school's interpreter or signs where the child uses sign language.

Sources

- College, Career, and Civic Life (C3) Framework for Social Studies State Standards, NCSS, 2013, read via an Internet Archive snapshot of the publisher's PDF (PDF page 46 for chronology, page 48 for historical sources). The unit uses these K-2 indicators, each checked word for word in that PDF:
  - D2.His.1.K-2 "Create a chronological sequence of multiple events." (lessons 1 and 5)
  - D2.His.2.K-2 "Compare life in the past to life today." (lessons 2 and 3)
  - D2.His.9.K-2 "Identify different kinds of historical sources." (lesson 4)
  - D2.His.10.K-2 "Explain how historical sources can be used to study the past." (lessons 4 and 5)
  - D2.His.11.K-2 "Identify the maker, date, and place of origin for a historical source from information within the source itself." (lesson 4)
  - D2.His.12.K-2 "Generate questions about a particular historical source as it relates to a particular historical event or development." (lessons 4 and 5)
- Alignment is limited to these named indicators; the whole framework was not reviewed, and no official endorsement is claimed.

Known gaps and cautions

- "When grown-ups were small" depends on how old the grown-ups are. The middle cards (a wall phone with a cord, a cassette player) fit many adults who were children in the 1980s or 1990s, but not all. Accept any placement a child can explain, and swap cards to fit your community.

- Some objects belong in more than one place: a small metal door key was used long ago and is still used now. Lesson 3 uses this on purpose to show that not everything changes.
- The Little Hill School pictures are made up. Real classrooms long ago differed between countries and between rich and poor places; if you use real archive photos, check the licence and say where and when they are from.
- Children of this age are still learning how long "long ago" is. The unit uses three bands and "about 100 years ago" on labels, not exact dates; dates and longer timelines come in later grades (see the progression).
- Comparing perspectives (D2.His.4.K-2) and comparing two accounts of the same event (D2.His.6.K-2) are left for grade 2.
- Pacing and vocabulary load are untested estimates; a qualified local educator should review the unit before classroom use.
- Peer check: Gemini 4 Argon did a text check at da91f30 (not an educator or classroom review). Timings, internal links and the C3 quotes were correct. Its notes were fixed in the follow-up commit (see PEERCHECKS.md): the Mrs Okafor card now answers questions about the slate, candlestick telephone and cassette player; the stove and bell cards are listed in the lesson 5 materials; lesson 1 keeps Rosa's cards up for lesson 2; and a doubled label was removed from the grade 1 plan. The follow-up commit is 09a3c44, which Argon also diff-checked the same day.
- The order of lessons, the activities and the timings are my choice, not taken from a source.

Lesson 1: What comes first? Making a timeline

Unit overview - Next: Lesson 2

Goal: Children put events in time order on a timeline and talk about them with first, next, then, last, before and after.

Length: about 40 minutes.

Materials

- A string "washing line" fixed across the board at adult height, with pegs.
- 6 large school-day cards: arriving at school, morning story, maths, lunch, outdoor play, going home. (Change them to match your school's real day.)
- Per pair: 5 "Rosa grows up" cards (Rosa as a baby, crawling, taking her first steps, starting kindergarten, in grade 1) and a 5-box number strip (1 to 5).
- Per pair (support group): 3 "Rosa grows up" cards only (baby, first steps, in grade 1).
- Per pair: 3 sunflower cards (seed, sprout, flower) for the closing check.
- Blank cards and pencils for the extension.

Steps

✎ Opening (5 min)

Hold up the "lunch" and "arriving at school" cards. "Which happens first today?" Peg "arriving" on the left of the line and "lunch" further right. Say: "This line is a **timeline**. Things that happen first go at this end. Things that happen later go further along."

✎ Main activity (25 min)

1. **Our school day (8 min).** Hand the other four school-day cards to children (or pairs). Each child brings their card and says where it goes: "Maths comes **after** morning story and **before** lunch." The class checks with a thumbs up or a thumbs down. Finish with the full day and read it together from left to right: "First..., next..., then..., last...".
2. **Rosa grows up (12 min).** Introduce Rosa: "Rosa is a made-up girl. These pictures show her growing up." Pairs put the 5 cards on their number strip, 1 to 5. Walk round and ask: "How do you know this one comes before that one?" (Clues: she is smaller; she is lying down, then crawling, then standing; she has a school bag.) Pairs who finish check another pair's strip and say one "before" and one "after" sentence.
3. **Same order, different line (5 min).** Peg Rosa's cards on the washing line under the school day. Ask: "Rosa's timeline is much longer than the school day. How long did it take Rosa to grow from a baby to grade 1?" (Years; about six years.) Say: "A timeline can show a day, or years, or even a very long time ago. We will use timelines all this unit."

✓ Discussion questions (5 min, with answers)

1. "What happened just after Rosa crawled?" (She took her first steps.)
2. "What happened before Rosa started kindergarten?" (Any earlier card: baby, crawling, first steps.)
3. "Could Rosa start kindergarten before she was a baby?" (No; she has to be born and grow first. Some things must happen in order.)

✓ Closing check (5 min, with answers)

Each pair gets the 3 sunflower cards, mixed up. "Put the sunflower in order." (Seed, sprout, flower.) Then ask individual children: "What came before the sprout?" (The seed.) "What came after the sprout?" (The flower.) Note who orders the cards and who uses "before" and "after".

Vocabulary

timeline, first, next, then, last, before, after, order

Differentiation

- **Support:** use the 3-card Rosa set (baby, first steps, in grade 1); say the sentence frame "First..., then..., last...".
- **Extension:** draw one more card for Rosa's timeline (for example "Rosa learns to ride a bike") on a blank card and decide where it goes.
- **Early finishers:** mix up a partner's strip and put it back in order.

Access

- Children who cannot reach the washing line hand their card to an adult and point or say where it goes.
- Low vision: large bold-outline cards, described aloud ("Rosa is lying on a blanket"); blind children can order the Rosa cards with raised outlines or by size of the figure, with the adult describing each card.
- Children can answer by speaking, signing, pointing or choosing a card.

⚠ Safety

- Only adults move the washing line; children peg cards standing on the floor, not on chairs.

Teacher notes

- Rosa's cards are about a made-up child. Do not ask children to make their own life timeline or bring baby photos (see Families, feelings and privacy in the unit overview).

- Keep the school-day line and Rosa's cards up for the rest of the unit (lesson 2 points back to Rosa's timeline); it is a useful reminder of left-to-right order.

Lesson 2: A classroom long ago and now

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children compare a made-up classroom from long ago with a classroom now, and say what changed and what stayed the same.

Length: about 40 minutes.

Materials

- Two large pictures (drawn or made up for this unit, not photos of real children):
  - **Little Hill School long ago (about 100 years ago):** long rows of wooden desks fixed together; children writing on slates with chalk; a teacher at a blackboard; an iron stove with a coal bucket; an abacus; a hand bell; a shelf of a few books; children skipping in the yard through the window.
  - **Little Hill School now:** tables in groups; whiteboards and pens; a teacher at a big screen; a radiator; a bin of counting cubes; a bookshelf with many picture books; children playing outside through the window.
- Per pair: 8 small detail cards cut from copies of the pictures (slate and chalk; whiteboard and pen; iron stove; radiator; hand bell; big screen; children reading a book; children playing outside) and a sorting mat with three boxes: "long ago" (old clock symbol), "now" (sun symbol), "both" (two linked hands symbol).
- A real slate (or a picture of one) and a small whiteboard for the closing check.
- Optional: magnifying glasses, one per pair.

Steps

✎ Opening (5 min)

Point to the washing-line timeline from lesson 1. "Rosa's timeline was a few years long. Today we go back much further: about 100 years, long before your grown-ups were born. This is Little Hill School long ago." Show the long-ago picture only. "What do you notice?" Accept anything the children see.

✎ Main activity (25 min)

1. **Look closely (7 min).** Show both pictures side by side. Model one comparison: "Long ago children wrote on a slate with chalk. Now we write on whiteboards or paper. That **changed**." Then: "Long ago children played outside. Now children play outside too. That **stayed the same**." Children point to more details with a partner.
2. **Sort the details (10 min).** Pairs sort the 8 detail cards onto the mat: long ago (slate and chalk, iron stove, hand bell), now (whiteboard and pen, radiator, big screen), both (children reading a book, children playing outside). Walk round: "How do you know?"
3. **Matching jobs (8 min).** Ask pairs to find a long-ago card and a now card that do the same **job**: slate and whiteboard (for writing); iron stove and radiator (for keeping warm). Then hold up the hand bell: "The bell called children in from the yard. What does our school use now?" (A bell, a buzzer, a whistle or the teacher calling; accept

what is true for your school.) Hold up the big screen: "Is there a long-ago card that does this job?" (Not really; the blackboard is closest.) Say: "Some things are the same job done a new way. Some things are new."

✓ Discussion questions (5 min, with answers)

1. "Why did the long-ago classroom need a stove?" (To keep warm in cold weather; there was no radiator.)
2. "Name one thing that is the same in both classrooms." (Children learn, read books, have a teacher, play outside; accept others with a reason.)
3. "Was it better long ago or now?" (There is no single right answer. Help children say what was **different**, for example "slates could be wiped and used again, like whiteboards".)

✓ Closing check (5 min, with answers)

Show the real slate and the whiteboard. Ask individual children: "Which one did children use long ago?" (The slate.) "What job do they both do?" (For writing, or for wiping clean and writing again.) "Tell me one thing that stayed the same in the classroom." (See discussion question 2.) Note who names a change and who names something that stayed the same.

Vocabulary

long ago, now, changed, stayed the same, both, slate, compare

Differentiation

- **Support:** sort only 4 cards (slate and chalk, whiteboard and pen, children reading, children playing) with the adult; the two "both" cards show that some things stay the same.
- **Extension:** find a third thing that stayed the same in the pictures and explain it to another pair.
- **Early finishers:** use a magnifying glass to find the smallest difference between the pictures.

Access

- Low vision: large pictures described aloud, detail by detail; detail cards with bold outlines.
- Blind children: hold the real slate and whiteboard while the adult describes the pictures; the slate is heavier and cool, the whiteboard smooth and light.
- Children can answer by speaking, signing, pointing or choosing a card.

⚠ Safety

- Slates can be brittle: an adult holds the real slate, or children touch it on the table. Use a slate from a loan box that is safe to handle (see the unit overview Safety section).

Teacher notes

- The pictures are made up. If you use real archive photos instead, check the licence and tell children where and when each photo is from.
- Avoid "children long ago were naughty" or "school was horrible". Stick to what can be seen in the pictures.

Lesson 3: Old and new objects

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children sort old and new versions of everyday objects onto a three-part timeline and give a clue for each choice.

Length: about 40 minutes.

Materials

- Three large time-band cards, pegged left to right on the washing line: **long ago** (old clock symbol), **when grown-ups were small** (a younger grown-up symbol), **now** (sun symbol).
- Per group of 4: 12 object picture cards in four families of three:
  - Phones: a candlestick phone (long ago); a wall phone with a cord and buttons (when grown-ups were small); a smartphone (now).
  - Music: a wind-up gramophone with a horn (long ago); a cassette player with headphones (when grown-ups were small); a smart speaker (now).
  - Keys: a big iron key (long ago); a small metal door key (when grown-ups were small, and still used now); a key card (now).
  - Toys: a wooden spinning top (long ago); a remote-control car with batteries (when grown-ups were small); a tablet game (now).
- Per group: a set of 4 clue cards with pictures: **what it is made of** (wood, iron, plastic); **wires or batteries**; **a screen**; **worn or new-looking**.
- A big iron key picture and a key card for the closing check.
- Optional: a museum or library loan box of real old objects (see Safety).
- For blind and low-vision children: the key family as real objects or raised-outline cards (heavy iron key, small metal key, flat plastic key card).

Steps

✎ Opening (5 min)

Hold up the candlestick phone card and the smartphone card. "These are both phones. Which is older? How can you tell?" Collect clues: the old one is tall, has a separate part to hold to your ear, and no screen. Show the clue cards and name each one.

✎ Main activity (25 min)

1. **Model the middle (5 min).** Peg the candlestick phone under "long ago" and the smartphone under "now". Hold up the wall phone. "This one is not as old as the first phone, but it is older than a smartphone. Many grown-ups had one like this at home when they were small." Peg it in the middle.
2. **Groups sort (12 min).** Each group sorts its 12 cards into three rows on the table: long ago, when grown-ups were small, now. For each card, one child holds up the clue card they used. Walk round and ask: "Which clue told you?"
3. **The tricky key (4 min).** Ask: "Where did you put the small metal key?" Groups will disagree. Say: "Small metal keys were used when your grown-ups were small, and lots

of doors still use them now. Some things change a lot, some change a little, and some stay nearly the same." Accept the key in the middle or under "now" with a reason.
4. **Check another group (4 min).** Groups look at one other group's rows and give a thumbs up or ask one "why?" question.

✓ Discussion questions (5 min, with answers)

1. "What do the newer objects often have that the old ones don't?" (Screens, batteries, wires or charging cables, buttons; accept plastic.)
2. "The gramophone and the smart speaker do the same job. What is it?" (Playing music.)
3. "Why do you think phones changed?" (Accept ideas: people invented new things, so they could carry them, so they could see pictures. This is a good guess, not a fact we checked.)

✓ Closing check (5 min, with answers)

Show the iron key and the key card. Ask individual children: "Which is older?" (The iron key.) "Tell me one clue." (It is made of iron; it is big and heavy; it looks worn; the key card is plastic and flat, and it works with a machine in the door.) Note who chooses correctly and gives a clue.

Vocabulary

old, older, newer, clue, invent, change, timeline

Differentiation

- **Support:** sort only the phone and key families (6 cards) with the adult, using one clue each.
- **Extension:** draw what a phone might look like in the future and say where it would go on the timeline (after "now").
- **Early finishers:** make a "same job" line: put one object from each family in a row and say the job each one does.

Access

- Blind and low-vision children sort the key family by touch (real keys or raised-outline cards), with an adult describing the other cards.
- Children can answer by speaking, signing, pointing or holding up a clue card.
- Groups share out the jobs (holding cards, sorting, holding the clue card, checking) in a fair way, as in term 1, so every child gets a turn at each job.

⚠ Safety

- Real old objects only from a loan box the lender says is safe to handle; leave out anything sharp, heavy, glass, electrical, with old batteries, or with peeling or flaking paint. Handle over a table with two hands. Wash hands afterwards.

- No real phones or tablets are passed round; use pictures.

Teacher notes

- "When grown-ups were small" is different for every adult. If your community's grown-ups did not use wall phones or cassette players, swap in objects they did use and say so.
- Do not ask children what phones, keys or music players their family has at home.

Lesson 4: Museum detectives

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children name different kinds of sources, find who made an object, where and roughly when from a museum label read aloud, and ask questions about it.

Length: about 40 minutes.

Materials

- Four large source cards with pictures: **an object** (a hand holding a key), **a picture** (a framed photo), **a written label** (a museum label card), **a person remembering** (an older person with a thought bubble).
- Per pair: 3 made-up museum label cards, each with a picture of the object and a label the adult reads aloud:
  - "School slate. Made by the Little Hill slate works, in Little Hill, about 100 years ago."
  - "Candlestick telephone. Made in a telephone factory in a big city, about 100 years ago."
  - "Cassette player. Made in a factory far away, about 40 years ago."
- A "question words" card with a picture for each word: who (a face), what (an object), where (a map pin), when (a clock), why (a thinking face), how (cogs).
- For the closing check: a spinning-top label card ("Wooden spinning top. Made by a toymaker in Little Hill, about 100 years ago.").
- A large sheet of paper and a marker for the class questions (kept for lesson 5).
- Blank cards and pencils for the extension.

Steps

✎ Opening (5 min)

"In lesson 2 we looked at pictures. In lesson 3 we looked at objects. How else can we find out about long ago?" Collect ideas, then show the four source cards and name them: "These are all **sources**. A source is something that tells us about the past."

✎ Main activity (25 min)

1. **What can a source tell us? (6 min).** Hold up the slate label card. Read the label aloud slowly. Ask: "**Who** made it?" (The Little Hill slate works.) "**Where**?" (In Little Hill.) "**When**?" (About 100 years ago.) Point to the who, where and when pictures on the question words card as you ask.
2. **Pairs read labels with an adult (10 min).** Adults move between pairs and read the other two labels aloud as many times as needed. Pairs point to the who, where and when pictures and answer each one. Answers: candlestick telephone: a telephone factory; a big city; about 100 years ago. Cassette player: a factory; far away; about 40 years ago.

3. **What can't it tell us? (4 min).** "Does the slate label tell us the name of a child who used it?" (No.) "Does it tell us if they liked school?" (No.) Say: "A source tells us some things. Other things we can only wonder about, so we ask questions."
4. **Ask a question (5 min).** Each pair picks one object and makes one question using a question word: "Who used this slate?", "How did the candlestick phone work?", "Why did people stop using cassettes?" Write (or scribe) the questions on a big sheet for lesson 5.

✓ Discussion questions (5 min, with answers)

1. "Name two kinds of source." (Any two: an object, a picture or photo, a written label or writing, a person remembering.)
2. "Which label told us about something from the longest time ago?" (The slate and the candlestick telephone, both about 100 years ago.)
3. "Could a person remember the cassette player?" (Yes, some grown-ups used one when they were small. A person remembering is a source too.)

✓ Closing check (5 min, with answers)

Read the spinning-top label to individual children. Ask: "Who made it?" (A toymaker.) "Where?" (In Little Hill.) "About how long ago?" (About 100 years ago.) "What question would you like to ask about it?" (Any question about the top.) Note who finds each answer and who asks a question.

Vocabulary

source, label, museum, who, what, where, when, why, how, question

Differentiation

- **Support:** use one label card with the adult, answering only who and where, with the question-word pictures to point at.
- **Extension:** make a museum label for an object in the classroom on a blank card: what it is, who made it (or "we don't know"), where, and about when, with the adult's help.
- **Early finishers:** think of a second question for a different object.

Access

- Every label is read aloud by an adult; no child needs to read.
- Low vision: large label cards with bold pictures, described aloud.
- Children can answer by speaking, signing, pointing to a question-word picture, or choosing a card.

⚠ Safety

- No special safety needs in this lesson.

Teacher notes

- The labels are made up for this unit; Little Hill and its slate works are fictional. If you visit a real museum or use a loan box, use the real labels and check them first.
- Keep the class question sheet for lesson 5.

Lesson 5: Our Little Hill timeline

Unit overview - Previous: Lesson 4

Goal: Children use a person's memories as a source, build a class timeline of the made-up town of Little Hill, and show what they know.

Length: about 40 minutes, plus about 4 minutes per child for the one-to-one check during the week.

Materials

- The three time-band cards from lesson 3, on a long paper strip on the floor or the wall (long ago, when grown-ups were small, now).
- One set of the 12 object cards from lesson 3.
- 6 Little Hill picture cards: a horse and cart, a gas street lamp (long ago); a box-shaped television, a red telephone box on the street (when grown-ups were small); an electric bus charging, a street light with a small solar panel (now).
- The class question sheet from lesson 4.
- Either an agreed visitor (see Families, feelings and privacy in the unit overview) or the **Mrs Okafor memory card** (below), read by the adult.
- Blu-tack or masking tape for the strip.
- A sticky note and pen (for "Mrs Okafor was six", or the visitor's name).
- The clue cards from lesson 3, for the support group.
- The stove and hand bell detail cards from lesson 2 (for Access).
- The cards needed for the one-to-one check (see Assessment in the unit overview).

The Mrs Okafor memory card (made up)

Read this aloud as a person's memory. Mrs Okafor is a made-up older person.

> "When I was six, about 70 years ago, I went to Little Hill School. Our classroom had a big stove, and on cold days we sat close to it. The teacher rang a hand bell to call us in from the yard. We played skipping and hopscotch. There was one telephone for our whole street, in a red telephone box, and you needed coins to use it. On Saturdays my grandad wound up his gramophone and we danced in the kitchen."

Answers for likely questions: games (skipping, hopscotch, marbles); food at school (soup and bread); television (not at home when she was six; one came later); how she got to school (she walked with her big brother); slates (yes, we wrote on slates with chalk and wiped them with a cloth); a candlestick telephone (not one I used; my grandad said the post office had one when he was small); a cassette player (they came later, when I was grown up). If a question has no answer here, say "Mrs Okafor's card doesn't tell us; who could we ask?"

Steps

✎ Opening (5 min)

Read the class questions from lesson 4. Say: "Today we have a new source: a **person remembering**. We can ask questions and listen."

✎ Main activity (25 min)

1. **Listen to a memory (8 min).** The visitor talks for about 3 minutes, or the adult reads the Mrs Okafor card. Children ask 3-4 questions from the sheet or new ones. With the card, the adult answers from the answers given; if the card does not say, the adult answers "Mrs Okafor's card doesn't tell us. That is something we could wonder about."
2. **Build the Little Hill timeline (12 min).** Hand out the 12 object cards and 6 Little Hill cards, one or two per child or pair. Each child places a card on the strip and gives a clue: "The gas lamp goes in long ago, because it has a flame and no wires." Everyone checks with a thumbs up or asks "why?". Add a sticky note "Mrs Okafor was six" (or the visitor's name) between long ago and when grown-ups were small.
3. **Walk the timeline (5 min).** Children walk along the strip from long ago to now and say one thing that changed and one that stayed the same (for example children still play outside; people still call each other, but on different phones).

✓ Discussion questions (5 min, with answers)

1. "Mrs Okafor remembered a telephone box. Where did that go on our timeline?" (When grown-ups were small, or between that and long ago; accept either with a reason.)
2. "What can a person remembering tell us that an object can't?" (How they felt, what they did, games they played, who they were with.)
3. "What did we learn that stayed the same in Little Hill?" (Children go to school, play, listen to music, phone people; accept others with a reason.)

✓ Closing check (5 min, with answers)

Ask individual children: "Point to long ago on our timeline. Point to now." (The left end and the right end.) "Tell me one kind of source we used this week." (An object, a picture, a label, a person remembering.) Note answers; the full one-to-one check (see the unit overview) is done during the week.

Vocabulary

memory, remember, source, timeline, long ago, now, changed, stayed the same

Differentiation

- **Support:** place one card with an adult, using the clue cards from lesson 3; walk the timeline holding a partner's hand or the adult's hand if wanted.

- **Extension:** add a card for the future at the far end of the timeline and explain it.
- **Early finishers:** find two cards on the timeline that do the same job (for example the gramophone and the smart speaker).

Access

- Children who cannot reach the strip hand their card to a partner or adult and say or point where it goes; a wall strip at sitting height works for wheelchair users.
- Blind and low-vision children place the key family by touch, and walk the timeline with an adult describing each card.
- Deaf children: the visitor or reader faces the class and holds up the matching picture card (stove, bell, telephone box, gramophone) while speaking; use the school's interpreter or signs where the child uses sign language.
- Children can answer by speaking, signing, pointing or choosing a card.

⚠ Safety

- Floor strip: keep it along a wall so nobody trips; children walk, not run, along it.

Teacher notes

- A visitor shares only what they choose. Agree the topic (their school days) beforehand. Children do not have to ask a question.
- Do not ask children about their own family's past. If a child tells you something from home, thank them and carry on.
- Leave the timeline up for term 3, when the class makes a map of Little Hill.

Grade 1 Society: Maps with a Key, and Land and Water on a Globe (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 10 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every activity against your school's rules.
>
> Text-checked by two other agents (GLM-5.3 Flash, Gemini 4 Argon); see Known gaps.

Back to the society progression | Grade 1 year plan - Term 3

Big idea

A map shows a place as if we were looking down on it from above. Maps use small pictures called **symbols**, and a **key** tells us what each symbol means, so anyone can read the map. We can use a map and its key to find things and to say where they are, and we can make our own map of a place we know. A **globe** is a round model of the whole Earth; it shows land and water, and there is much more water than land.

This is the third society unit of grade 1 (term 3). It builds on the kindergarten unit Near and far, our school walk and a picture map (a map is a picture from above; near, far, next to, in front of, behind) and uses the made-up town of Little Hill from grade 1 term 1 and term 2. Grade 1 adds symbols and a key, finding things with the key, making a map with a key, and a first look at a globe.

Outcomes

By the end of the unit most children can:

1. Match three classroom objects to their pictures "from above" and say that a map shows a place from above.
2. Use the key of the Little Hill map to say what three symbols stand for, and find one of each on the map.
3. Say where something is on the map with **next to**, **near**, **between** and **across the river** (not left and right).
4. With a group, make a simple map of a corner of the classroom with a key of at least three symbols.
5. Point to land and to water on a globe, and say one way a globe is different from a flat map.

Prior knowledge

- Kindergarten society term 3: a map is a picture from above; near, far, next to, in front of, behind; a picture map of the school.
- Grade 1 society terms 1 and 2: the made-up town of Little Hill; working in pairs and groups.
- Grade 1 mathematics: counting to 20 (counting symbols on the map) and flat shapes (drawing outlines from above).
- No reading is needed. The key uses pictures; the words in the key are for the adult.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week.

Lesson	Title	Main activity
1	Looking down from above	Look down on objects on a tray, draw their outlines, match "side" and "from above" pictures
2	Symbols and a key	Meet the Little Hill map; match symbols to the key; invent a symbol
3	Using the key to find things	Count symbols; follow position clues to place toys on the map
4	Making a map with a key	Groups make a map of a classroom corner with a key; a partner group reads it
5	Land and water on a globe	Explore a globe and a flat world map; find land and water; show what you know

Materials (whole class unless noted)

- Lesson 1: per group of 4, a tray with 4 objects (a plastic cup, a small box, a ball, a wooden block); per child, a sheet of paper with a large square drawn on it (the "tray") and a pencil; per pair, 8 matching cards (4 "from the side" and 4 "from above" pictures of a cup, a chair, a table and a toy car); per child, a 3-card "from above" set (cup, box, ball) for the closing check; for tactile access, the real objects and felt or card cut-outs of their outlines.
- Lesson 2: a large Little Hill map (A1 or bigger; how to draw it is in lesson 2) with a key of 6 symbols; per pair, a small copy of the map and a set of 6 loose symbol cards; blank cards and pencils for inventing a symbol; a raised-symbol version of the map and key (see Access); the tray drawings from lesson 1.
- Lesson 3: the large Little Hill map and the pair copies from lesson 2; per pair, 4 small toys or counters with pictures (a cat, a kite, a ball, a duck); 4 large clue cards (read by the adult; listed in lesson 3); the playground symbols from lesson 2 and sticky tack; a large toy or picture of a bear for the closing check; the 4 toys as real small objects for the raised-symbol map.
- Lesson 4: per group of 4, a large sheet of paper with the outline of the chosen classroom corner drawn by the adult (door, wall and window marked); pre-cut paper shapes for furniture (rectangles and circles; adult-cut); glue sticks; crayons; a blank key strip with 4 boxes; per group, 4 job cards with pictures (shape placer, symbol drawer, key maker, checker); per group, one small toy for hiding and a star sticker (for the closing check); sticky or foam shapes and card for tactile maps; the tray drawings from lesson 1.
- Lesson 5: a globe on a stand (a raised-relief globe if the school has one); a flat world map; the large Little Hill map and the group maps from lesson 4; an inflatable globe ball; a class tally chart with a wave picture (water) and a hill picture (land); per child, a wave card and a hill card; for the one-to-one check, a cup, a box, a ball, the 3-card "from above" set from lesson 1 and a pair copy of the Little Hill map (for blind or low-vision children, the lesson 1 tactile outline cut-outs and the lesson 2 raised-symbol map and key instead).
- For tactile or low-vision access: large, bold-outline cards described aloud; raised symbols (felt, foam or glued string) on one copy of the Little Hill map and its key; a raised-relief globe or a globe with land areas outlined in glued string where possible.

Assessment

- Lessons 1-4: the teacher notes answers in the closing checks (observe; no writing needed). Children can answer by speaking, signing, pointing or choosing a picture card.
- Lesson 4: the group map is evidence for outcome 4. Note which children chose a symbol, placed a shape or helped make the key; every child should have one job (see lesson 4).
- End-of-unit one-to-one check (about 4 minutes per child; plan extra small-group time in the week, as 40 minutes is not enough for a whole class). Materials: a cup, a box and a ball and the 3-card "from above" set; a pair copy of the Little Hill map with its key; the globe; the flat world map. For blind or low-vision children, use the tactile outline cut-outs from lesson 1 and the raised-symbol map and key from lesson 2. Answer guide:
    1. "Which picture shows the cup from above? The box? The ball?" (Cup: a circle (a ring); box: a rectangle or square; ball: a circle.) "What does a map show?" (A place seen from above; any answer about looking down counts.)
    2. "Point to this symbol in the key. What does it mean? Find one on the map." Do this for three symbols (for example tree, house, school). (Each symbol's meaning is in the key; any matching symbol on the map counts.)
    3. "Where is the pond? Use a place word." (For example next to the trees, near a house, across the river from the school.) Accept any true position word; "left" or "right" is fine if the child says whose left ("on my left").
    4. Outcome 4 is assessed from the group map in lesson 4, not in this check.
    5. Globe. "Show me some water. Show me some land." (Any water or land area.) "How is the globe different from this flat map?" (It is round; you can turn it; it is a ball like the Earth; the flat map shows the whole world at once.)
- There is no validated pass mark. The check covers the main ideas, not every skill in the unit.

⚠ Safety (read before lesson 1)

- Trays and objects: plastic or wooden objects only (no glass or china). Small objects stay on tables and out of mouths.
- Scissors: the adult cuts the furniture shapes in advance; children only glue and draw.
- Globe: an adult carries it and puts it on a table. Children turn it gently with one hand while it stays on its stand; nobody spins it fast.
- The inflatable globe in lesson 5 is passed hand to hand in a circle, not thrown or kicked.

Families, feelings and privacy

- Little Hill is a made-up town. Every map in this unit is of Little Hill or of the school. Never ask children to draw or describe their home, their street, where they live or how they get to school, and do not mark children's homes on any map.
- Children who want to say where they have been or where their family comes from can do so on the globe in lesson 5; nobody has to. Do not ask children where they or their family were born.
- Some children have moved home or country, or live in more than one home; this is another reason the unit uses a made-up town.

Access and taking part

- Every card and every symbol has a picture, so no child needs to read.
- Children may answer by speaking, signing, pointing, choosing a card or using a communication device. Give extra waiting time.
- Colour is never the only clue. Each map symbol has its own shape (see lesson 2), and water has wavy lines as well as blue colour. On the globe, tell children with colour-vision differences that water is usually the smoothest and largest part; a raised-relief globe helps everyone feel the difference.
- Low vision and blind children: large, bold-outline cards described aloud; a raised-symbol copy of the Little Hill map, explored with the adult guiding the child's hand from the key to the map; tactile maps in lesson 4 made with sticky or foam shapes.
- Children who cannot reach the large map or globe have a pair copy of the map on their table, and the globe is brought to them.
- Deaf children: face the class when giving clues; point to the symbol or place as you say each word; use the school's interpreter or signs where the child uses sign language.

Sources

- College, Career, and Civic Life (C3) Framework for Social Studies State Standards, NCSS, 2013, read via an Internet Archive snapshot of the publisher's PDF (PDF page 41 for geographic representations). The unit uses these K-2 indicators, each checked word for word in that PDF:
  - D2.Geo.1.K-2 "Construct maps, graphs, and other representations of familiar places." (lessons 1 and 4)
  - D2.Geo.2.K-2 "Use maps, graphs, photographs, and other representations to describe places and the relationships and interactions that shape them." (lessons 2 and 3)
  - D2.Geo.3.K-2 "Use maps, globes, and other simple geographic models to identify cultural and environmental characteristics of places." (lessons 3 and 5)
- The same PDF (page 14) says that particulars "such as ... the difference between a map and a globe" are decisions for each state. Teaching map versus globe in grade 1 is **my choice**, not a C3 requirement.
- Ocean, Wikipedia, read on 10 November 2026, for the teacher fact in lesson 5: "Approximately 71% of Earth's surface ... is covered by ocean."
- Alignment is limited to these named indicators; the whole framework was not reviewed, and no official endorsement is claimed.

Known gaps and cautions

- Written 10 November 2026. Text-checked by GLM-5.3 Flash the same day (C3 indicator quotes and page numbers against the PDF, the ocean figure and its classroom wording, map counts, key, job cards, materials and links): no errors reported, so no changes were needed. Also text-checked by Gemini 4 Argon the same day (all files, links, timings, counts and citations): no errors, two optional notes (tactile materials for the one-to-one check; both shops share one symbol), both added in 635565b, which Gemini 4 Argon also diff-checked the same day (see PEERCHECKS.md). Not yet checked by a teacher.
- The kindergarten map unit says grade 1 returns to a school walk and makes a route map of the local area. This unit keeps maps inside the school and the made-up town (no walk outside the school and no real streets), to protect privacy and to keep the focus on symbols and keys. Schools that already do local walks safely can add one.

- Compass directions (north, south, east, west), grid references, scale and continent and ocean names are left for later grades (see the progression). The globe lesson names only "land" and "water"; children may name places they know, but no names are taught or assessed.
- Left and right depend on where you stand, so the unit uses next to, near, between and across for map positions. Children who use left and right are asked "whose left?"; this is a choice, not taken from a source.
- "Blue for water" is true of most globes and maps but not all; check yours (lesson 5).
- The "land or water?" game in lesson 5 is a game, not a measurement; where a hand lands is not truly random. The fact that there is more water than land comes from the source above, not from the game.
- Pacing and vocabulary load are untested estimates; a qualified local educator should review the unit before classroom use.
- The order of lessons, the activities, the Little Hill map layout, the symbols and the timings are my choice, not taken from a source.

Lesson 1: Looking down from above

Unit overview - Next: Lesson 2

Goal: Children see that things look different from above and from the side, draw objects "from above", and say that a map shows a place from above.

Length: about 40 minutes.

Materials

- Per group of 4: a tray with 4 objects: a plastic cup, a small box, a ball and a wooden block.
- Per child: a sheet of paper with a large square drawn on it (the "tray") and a pencil.
- Per pair: 8 matching cards: 4 "from the side" pictures (a cup, a chair, a table, a toy car) and 4 "from above" pictures of the same things.
- Per child: a 3-card "from above" set (cup, box, ball) for the closing check.
- For tactile access: the real cup, box and ball, and felt or card cut-outs of their outlines from above (a ring, a rectangle, a circle).
- The kindergarten classroom picture map, if the school still has it (optional, for the opening).

Steps

✎ Opening (5 min)

Hold a plastic cup at children's eye level. "What shape do you see?" (Sides and a rim, a bit like a rectangle.) Now hold it low so children look down into it. "What shape now?" (A circle, a ring.) Say: "The same cup looks different when we look at it **from the side** and **from above**. A bird flying over us sees everything from above. A **map** is a picture of a place from above." If you have the kindergarten picture map, show it: "You made a map like this in kindergarten."

✎ Main activity (25 min)

1. **Look down on the tray (10 min).** Each group stands round its tray and looks straight down. "Which objects look like a circle from above? Which look like a square or a rectangle?" (Cup: a circle or ring; ball: a circle; box and block: rectangles or squares, depending on the shapes.) Children may move the objects first and then look again.
2. **Draw the tray from above (10 min).** Each child draws the outline of each object, from above, inside the square on their paper, in the place where it sits on the tray. "Draw only what you see from above: the outline." Walk round and ask: "Where is the ball on your drawing? Is it next to the cup on the tray too?" Say: "Your drawing is a map of the tray."
3. **Side or above? (5 min).** Pairs match each "from the side" card with its "from above" card (cup with a circle, chair with a square seat and four small corners, table with a big rectangle, toy car with a long rectangle with wheels peeping out).

✓ Discussion questions (5 min, with answers)

1. "Why does a ball look like a circle from the side and from above?" (It is round all over; it is the same shape from every side.)
2. "Why does a map show places from above?" (So we can see where everything is at once; from the side, tall things hide things behind them.)
3. "Look at your tray drawing. If someone moved the ball, would your map still be right?" (No; the map would need to change. A map shows where things were when it was made.)

✓ Closing check (5 min, with answers)

Each child has the 3-card "from above" set. Hold up the real objects one at a time: "Show me this one from above." (Cup: the ring or circle; box: the rectangle; ball: the circle.) Accept the circle for either the cup or the ball if the child explains (the cup card has a rim inside the circle). Then ask a few children: "What does a map show?" (A place from above.) Note who matches the cards and who uses "from above".

Vocabulary

from above, from the side, outline, map

Differentiation

- **Support:** use 2 objects on the tray (ball and box); match only the cup and toy car cards.
- **Extension:** draw the whole group table from above, with the tray on it.
- **Early finishers:** move two objects on the tray, and ask a partner to change the drawing to match.

Access

- Blind and low-vision children explore each object with their hands, then find its outline cut-out (ring, rectangle, circle) and place it on a square of card, in the same place as the object on the tray. The adult describes each card aloud in the matching task.
- Children who cannot stand round the tray have it brought to their table and look down from their seat.
- Children can answer by speaking, signing, pointing or choosing a card.

⚠ Safety

- Plastic or wooden objects only; no glass or china.
- Children look down at the tray from where they stand; nobody climbs on a chair or table to get higher.

Teacher notes

- Keep the tray drawings for lesson 4, where children make a bigger map in the same way.
- The cup card "from above" should show a ring (a circle with a smaller circle inside) so it is different from the ball.

Lesson 2: Symbols and a key

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children learn that maps use small pictures called symbols, and that a key tells us what each symbol means.

Length: about 40 minutes.

Materials

- A large Little Hill map (A1 or bigger) with its key (how to draw it is in the teacher notes).
- Per pair: a small copy of the map with its key, and a set of 6 loose symbol cards (house, tree, shop, school, water, bridge).
- Blank cards and pencils for inventing a symbol.
- A raised-symbol copy of the map and key (felt, foam or glued string).
- The tray drawings from lesson 1.

Steps

✎ Opening (5 min)

Hold up one child's tray drawing from lesson 1 (with permission) and a real cup. "On this map the cup is a small circle. We did not draw the whole cup; we drew a small picture that stands for it." Say: "A small picture that stands for something on a map is a **symbol**."

✎ Main activity (25 min)

1. **Meet Little Hill from above (8 min).** Show the large map. "This is Little Hill, the made-up town we know, seen from above, like a bird flying over it." Point to the river: "What do you think these wavy lines are?" Let children guess, then say: "Some of you guessed. How can we be sure?" Show the **key** in the corner: "The key tells us what each symbol means." Go through the six symbols one at a time, pointing to the key and then to one on the map.
2. **Match the key (10 min).** Pairs take the 6 loose symbol cards and lay each one on the matching symbol in their map's key, saying what it means ("This one is a tree"). Then they find one of each on the map and put a finger on it. Walk round: "How did you know that is a school?" (It has the same symbol as the school in the key: a building with a flag.)
3. **Invent a symbol (7 min).** "Little Hill is building a playground. It needs a symbol." Each pair draws a simple symbol for a playground on a blank card (for example a slide or a swing). Share two or three. Ask: "What else would the map need, so people know what our symbol means?" (We would need to add it to the key.)

✓ Discussion questions (5 min, with answers)

1. "Why do maps use symbols and not big pictures?" (Big pictures would not fit; small symbols keep the map clear; you can draw many.)
2. "Why does a map need a key?" (So everyone knows what the symbols mean; without it people have to guess.)
3. "The water is blue on our map. How else can we tell it is water?" (The wavy lines; the key shows the wavy-line symbol means water.)

✓ Closing check (5 min, with answers)

Point to a symbol in the key on the large map (or hand a child a loose symbol card): "What does this symbol mean? Can you find one on the map?" Ask several children, using different symbols. (Each answer is in the key: house, tree, shop, school, water, bridge.) Note who uses the key to work it out, and who finds a matching symbol on the map.

Vocabulary

symbol, key, map, from above

Differentiation

- **Support:** start with 3 symbols (house, tree, water); add the others when the child is ready.
- **Extension:** invent a symbol for one more thing (for example a bus stop) and draw a key box for it.
- **Early finishers:** count how many tree symbols are on the map (6) and how many house symbols (4).

Access

- Blind and low-vision children use the raised-symbol copy: the adult guides the child's hand to each raised symbol in the key, then helps the child find the same shape on the map.
- Each symbol has its own shape, so colour is never the only clue: house (a square with a triangle roof), tree (a circle on a short stick), shop (a square with a striped awning), school (a building with a flag), water (wavy lines; blue as well), bridge (two parallel lines across the river).
- Children can answer by speaking, signing, pointing or choosing a symbol card.

⚠ Safety

- No special risks. Raised symbols must be stuck down firmly so small pieces do not come off.

Teacher notes

- **How to draw the Little Hill map** (this layout is my choice; keep it the same for lessons 2, 3 and 5):
  - A river runs across the middle of the map, from one side edge to the other, with one bridge in the middle.
  - On the **school side** of the river: the school just next to the bridge; 2 houses at one end; a park with 3 trees at the other end.
  - On the **pond side** of the river: a pond at one end with 3 trees next to it; 2 shops (a bakery and a toy shop) just next to the bridge; 2 houses at the other end.
  - Totals: 4 houses, 6 trees, 2 shops, 1 school, 1 bridge, water for the river and the pond.
  - The key, in a box in one corner, shows the six symbols, each with a word for the adult: house, tree, shop, school, water, bridge.
- Do not add children's homes, real street names or real places to the map.
- Keep the playground symbols for lesson 3.

Lesson 3: Using the key to find things

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children use the key to find and count things on a map, and say where things are with next to, near, between and across the river.

Length: about 40 minutes.

Materials

- The large Little Hill map with its key, and the pair copies from lesson 2.
- Per pair: 4 small toys or picture counters: a cat, a kite, a ball and a duck.
- 4 large clue cards, each with a picture of the toy and the clue (read by the adult; the clues are in step 2).
- The playground symbols the pairs drew in lesson 2, and sticky tack.
- A large toy or picture of a bear for the closing check.
- The raised-symbol copy of the map from lesson 2, with the 4 toys as real small objects for touch.

Steps

✎ Opening (5 min)

Point to the key on the large map. "Who can remember what the key is for?" (It tells us what the symbols mean.) "Today we will use the key to find things in Little Hill." Recap the place words from kindergarten: next to, near, far. Add two new ones with the map: **between** ("the bridge is between the school and the shops") and **across the river** ("the pond is across the river from the park").

✎ Main activity (25 min)

1. **Count with the key (7 min).** Pairs use their copy of the map. "Find the house symbol in the key. How many houses are in Little Hill?" (4.) "How many trees?" (6.) "How many shops?" (2.) Pairs touch each symbol as they count. Check together on the large map.
2. **Clue hunt (12 min).** Read one clue card at a time and show its picture. Pairs put the toy on their map where the clue says:
   - "The cat is next to the pond." (Anywhere beside the pond.)
   - "The kite is in the park, between two trees." (In the park, between any two of its 3 trees.)
   - "The ball is across the river from the school, next to a shop." (On the pond side of the river, beside the bakery or the toy shop.)
   - "The duck is on the water, but not on the river." (On the pond.) After each clue, one pair shows where they put the toy on the large map and says why.
3. **Whose left? (6 min).** Ask a child sitting opposite you to stand on the other side of the large map. Point to the pond: "Is the pond on the left or the right?" Children on each side give different answers. "We are both right! Left and right change when you turn round. **Next to** the pond does not change." Turn the pair maps round and check: the

cat is still next to the pond. Say: "On a map, we use next to, near, between and across. If you say left or right, say whose left."

✓ Discussion questions (5 min, with answers)

1. "How did the key help you find the shops?" (We looked at the shop symbol in the key and found the same symbol on the map.)
2. "What do you cross to go from the school to the bakery?" (The river, by the bridge.) Both shops use the same shop symbol, so point to the bakery first, or accept either shop.
3. "Why is 'next to the pond' a better clue than 'on the left'?" (Left changes when you turn round or stand on the other side; next to stays the same.)

✓ Closing check (5 min, with answers)

Put the large bear next to the bakery on the large map (or tell a blind child, guiding their hand). Ask individual children: "Where is the bear? Use a place word." (For example: next to the bakery or a shop; near the bridge; across the river from the school. Both shops share one symbol, so "next to a shop" is a full answer.) Then: "Find me a tree, using the key." (Any tree symbol.) Note who uses a true position word and who uses the key.

Vocabulary

key, symbol, next to, near, between, across the river

Differentiation

- **Support:** use only the cat and duck clues; give the sentence frame "The ... is next to the ...".
- **Extension:** pairs choose a place for their playground symbol, stick it on their map, and give another pair a clue to find it ("The playground is between the ... and the ..."). Add the playground symbol to the key.
- **Early finishers:** write or say their own clue for a toy and give it to a partner.

Access

- Blind and low-vision children use the raised-symbol map and the small real objects; the adult reads each clue and guides the child's hand from the key symbol to the map.
- Deaf children: show the clue card picture and point to each place on the large map as you say the clue; use signs for the place words if the child uses sign language.
- Children who cannot move to the large map show their answer on their pair copy.
- Children can answer by speaking, signing, pointing or placing a toy.

⚠ Safety

- Small toys and counters stay on tables and out of mouths.

Teacher notes

- Accept any place that matches a clue; several places are right for most clues (any spot beside the pond, any two trees in the park).
- "Across the river from" only works when the river is between the two places; check children's answers against the map.
- Leave the Little Hill map up for lesson 5.

Lesson 4: Making a map with a key

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: In groups, children make a map of a corner of the classroom from above, with symbols and a key, and another group uses it to find something.

Length: about 40 minutes.

Materials

- Per group of 4: a large sheet of paper with the outline of the chosen classroom corner drawn by the adult (walls as lines, with the door and window marked).
- Pre-cut paper shapes for furniture: rectangles (tables, shelves, rug) and circles (stools, plant pot). Adult-cut.
- Glue sticks and crayons.
- Per group: a blank key strip with 4 boxes.
- Per group: one small toy for hiding, and a star sticker.
- Per group: 4 job cards with a picture (shape placer, symbol drawer, key maker, checker).
- Sticky or foam shapes and a piece of card for a tactile map.
- The tray drawings from lesson 1.

Steps

✎ Opening (5 min)

Show a tray drawing from lesson 1. "You made a map of a tray. Today each group makes a map of a real place: our [reading corner]." Stand at the edge of the corner and point: "If a bird looked down from the ceiling, what would it see?" (The tops of the tables, the rug, the shelves.) Show one group's outline sheet and point out the walls, the door and the window.

✎ Main activity (25 min)

1. **Jobs (2 min).** Each child in the group takes a job card. **Shape placer:** chooses and places the furniture shapes. **Symbol drawer:** draws a symbol on each shape (for example a book on the shelf). **Key maker:** draws the same symbols in the key strip. **Checker:** looks at the real corner and says if each shape is in the right place. Everyone helps glue.
2. **Place the shapes (8 min).** Groups look at the real corner and lay the shapes on their sheet in the right places before gluing. Ask: "What is next to the shelf in the real corner? Is it next to the shelf on your map too?"
3. **Symbols and key (8 min).** Groups choose a symbol for at least 3 things (for example shelf, rug, table) and draw each one on the map and in the key. "Could another group read your map without asking you?"
4. **Hide and mark (7 min).** While each group watches, the adult puts the group's toy somewhere in the corner. The group sticks the star sticker on its map in the same place

and adds a star to the key: "star = toy". Then the adult moves the toy away again, and groups swap maps.

✓ Discussion questions (5 min, with answers)

1. "How did you decide where the rug goes on the map?" (We looked at the real corner; we checked what it was next to.)
2. "Why does your map need a key?" (So the other group knows what our symbols mean.)
3. "Two groups made maps of the same corner. Why do they look different?" (Different symbols, colours and drawing; they can both be right if things are in the right places.)

✓ Closing check (5 min, with answers)

Each group has another group's map. The adult puts that group's toy back in the place its star shows. One child from the receiving group uses the map to walk to (or point to) the place in the real corner and says how they knew. (For example: "The star is next to the book symbol, and the key says the book symbol is the shelf, so the toy is next to the shelf.") Note which groups' maps let another group find the toy, and which children explain using the key or a place word.

Vocabulary

map, symbol, key, from above, next to

Differentiation

- **Support:** the adult draws the outline with the biggest furniture already in place; the group adds 2 symbols and a 2-box key.
- **Extension:** add the door and window to the key, or add a symbol for a plant or the teacher's chair.
- **Early finishers:** check the map against the real corner and fix one thing.

Access

- A tactile map: the group (or a child with a visual impairment and an adult) places sticky or foam shapes on card, each a different shape or texture, and the key uses the same shapes. In the closing check, the adult guides the child's hand from the star to the nearby shapes and then walks with the child to the place.
- Children who use a wheelchair or cannot walk round the corner do the checker or key maker job, and point to the place in the closing check.
- Any job can be shared. A child who prefers not to draw can place shapes or check.
- Children can answer by speaking, signing, pointing or showing the place.

⚠ Safety

- The adult cuts the shapes in advance; no scissors for children in this lesson.

- Choose a corner with a clear floor; children walk, and stay out of the corner while the adult hides the toy.

Teacher notes

- Choose a corner with 4 to 6 big objects (for example the reading corner: rug, shelf, floor cushion, table). All groups can map the same corner.
- Do not hide the toy anywhere high, inside a cupboard or near the door.
- Keep the group maps for assessment of outcome 4 and display them next to the Little Hill map in lesson 5.

Lesson 5: Land and water on a globe

Unit overview - Previous: Lesson 4

Goal: Children learn that a globe is a round model of the whole Earth, find land and water on a globe and a flat map, and show what they know about maps.

Length: about 40 minutes.

Materials

- A globe on a stand (a raised-relief globe if the school has one).
- A flat world map.
- The large Little Hill map and the group maps from lesson 4.
- An inflatable globe ball (a soft "beach ball" globe).
- A class tally chart on the board with two columns: a wave picture (water) and a hill picture (land).
- Per child: a wave card and a hill card for the closing check.
- For the one-to-one check (later in the week; see the unit overview): a cup, a box and a ball and the 3-card "from above" set from lesson 1; a pair copy of the Little Hill map with its key. For blind or low-vision children: the tactile outline cut-outs from lesson 1 and the raised-symbol map and key from lesson 2.

Steps

✎ Opening (5 min)

Point to the Little Hill map and the group maps. "These maps show small places: a town, a corner of our classroom. What if we wanted to show the **whole Earth**, where everybody lives?" Bring out the globe. "This is a **globe**. It is a model of the Earth. The Earth is round like a ball, so the globe is round too." Let children say what they notice.

✎ Main activity (25 min)

1. **Land and water (8 min).** Turn the globe slowly. "On this globe, blue means **water**: seas and oceans. The other colours mean **land**." (Check your own globe's key first; most globes use blue for water, but not all.) Children come up in small groups and touch one water place and one land place, saying "water" or "land". On a raised-relief globe, let them feel that the land is often a little raised and the water is smooth.
2. **Globe and flat map (7 min).** Hold up the flat world map next to the globe. "This map shows the whole world too, but it is flat." Find one big blue area on the globe, then the same area on the flat map. Ask: "What is different?" (The globe is round and you turn it to see the other side; the flat map shows everything at once; you can fold or hang the flat map.) "What is the same?" (Both show land and water; both have blue for water.)
3. **Land or water? (10 min).** Children sit in a circle. Pass the inflatable globe hand to hand (not thrown). When the adult says "stop", the child holding it looks where their right hand is touching (or any hand, or the adult checks for them) and says "water" or "land". The adult marks the tally chart. After about 20 turns, count the two columns

together. Say: "This is a game, not a real measurement. But people who have measured the whole Earth found that there is much **more water than land**: about 7 parts out of every 10 parts of the Earth's outside are ocean." Compare with the class tally: "Did our game show more water too?" (Usually yes; if not, that is fine; the game is a guess, the measurement is the fact.)

✓ Discussion questions (5 min, with answers)

1. "What is a globe?" (A round model of the whole Earth.)
2. "How is a globe different from a flat map?" (It is round; you turn it; it shows the Earth's real shape; a flat map shows everything at once.)
3. "Is there more land or more water on Earth?" (More water.)
4. "How are the Little Hill map and the globe the same?" (Both are pictures of places from above; both use colours or symbols that mean something.)

✓ Closing check (5 min, with answers)

Each child has a wave card and a hill card. Point to places on the globe and the flat map one at a time: "Land or water?" Children hold up a card. (Blue areas: water, the wave card; other colours: land, the hill card.) Then ask a few children: "How is the globe different from the flat map?" (Round, turns, shows the real shape of the Earth.) Note who holds up the right card and who gives a difference.

Vocabulary

globe, model, Earth, land, water, ocean, flat map

Differentiation

- **Support:** at the globe, touch only one big water area and one big land area, with the adult naming them.
- **Extension:** find the biggest blue area on the globe and the same area on the flat map, and say why it looks a different shape on the flat map (the round globe is spread out flat).
- **Early finishers:** look at the group maps from lesson 4 and say what is the same as on the globe (both have a key or colours that mean something).

Access

- Blind and low-vision children: a raised-relief globe, or a globe with land areas outlined in glued string, explored with the adult; on the inflatable globe, the adult tells the child whether their hand is on land or water.
- Colour vision: point out that water is usually the largest and smoothest part, and land usually has more lines and names on it; the wave and hill cards have pictures, not only colours.
- Children who cannot hold or pass the ball can touch it as it is held next to them, or say "stop" for the class.
- Children who want to say where they have been or where their family is from can find it on the globe with an adult; nobody has to, and the teacher does not ask.

- Children can answer by speaking, signing, pointing or holding up a card.

⚠ Safety

- An adult carries the globe and puts it on a table; children turn it gently with one hand while it stays on its stand.
- The inflatable globe is passed hand to hand, not thrown or kicked.

Teacher notes

- The fact for the class comes from the Wikipedia article on the ocean (see Sources in the unit overview): "Approximately 71% of Earth's surface ... is covered by ocean." "About 7 parts out of every 10" is a rounded way to say this to young children.
- The tally game will not give exactly 7 out of 10 and may even give more land; say it is a game, and the measurement is what tells us the answer.
- Do not teach names of continents or oceans in this lesson; they come in later grades. Children may name places they know.
- Teaching the difference between a map and a globe at this age is my choice; the C3 framework leaves it to each state (see Sources).

Grade 2 Society: People, Jobs and Choices (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 10 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every activity against your school's rules.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 1. Builds on grade 1: Rules, fairness and community jobs and the society progression

Big idea

A community works because many people play a part, not only the leaders. People make goods and give services, and each one needs skills and knowledge that someone had to learn. Things in a shop have prices, and some goods are made nearby while others come from far away. There is never enough of everything, so people have to choose, and every choice has a good side (a benefit) and something you give up (a cost).

This is the first society unit of grade 2 (term 1). In grade 1 the children sorted Little Hill job cards into goods and services and named a tool and a skill for each job. Here they add who else helps a community, how skills are learned, prices, scarcity and choosing.

Outcomes

By the end of the unit most children can:

1. Explain, using a made-up Little Hill story, how people who are not leaders (a child, a neighbour, a shopkeeper, a volunteer) help a community.
2. Say what someone needs to know or be good at to make one good or give one service, and one way they could have learned it.
3. Read and compare prices on made-up market price cards (up to 20 Little Hill coins), and say whether a good was made in Little Hill or came from somewhere else.
4. Explain, with the class shop, that when there is not enough of something people have to decide who gets it or what to buy, and suggest one fair way to decide.
5. Name one benefit and one cost of a choice made by a story character.

Prior knowledge

- Grade 1 society term 1: rules with "so that..." reasons; three kinds of fair (equal shares, taking turns, giving what someone needs); goods and services; a tool and a skill for each job.
- Grade 1 maths: counting and comparing to 100; adding within 20. Grade 2 maths term 1 runs alongside, so prices stay at 20 coins or less and every sum stays within 20.
- No reading is needed. Every card has a picture; words on cards are for the adult.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week.

1. Everyone has a part: the Little Hill park clean-up story; who did what, and what would have happened without them.
2. Skills for goods and services: what a job needs you to know or be good at, how people learn it; the class makes one good and gives one service.
3. Prices at the Little Hill market: reading and comparing price cards; made in Little Hill or came from elsewhere.
4. Not enough to go round: the class shop has fewer kites than people who want one; ways to decide; you cannot buy everything with 10 coins.
5. Choosing, and what you give up: benefits and costs of story characters' choices; class shop round; private check.

Materials (whole class unless noted)

- Large picture story cards for "The Park Clean-Up" (6 cards; text in lesson 1).
- Per pair: 6 helper cards from the story: Mayor Hen, Duck (a child), Mouse (a neighbour), Goat (the shopkeeper), Bear (a volunteer), Remy (the bin collector).
- Per pair: the 8 grade 1 job cards (baker, bus driver, nurse, librarian, farmer, bin collector, builder, hairdresser) plus 4 new ones: potter, cook, vet, mechanic.
- Per pair: a "how did they learn it?" mat with four pictures: watching someone, practising, a book, a teacher or course.
- For the class-made good and service (lesson 2): strips of card about 5 cm by 20 cm, crayons, a hole punch (adult only) and wool for bookmarks; a tray of mixed classroom pencils and crayons to sort back into pots.
- Per pair: 10 market price cards (made-up goods and prices; list in lesson 3), each with a small picture of either Little Hill or a lorry/ship.
- Per pair: a "made here / came from elsewhere" sorting mat.
- Per child: 10 "Little Hill coins" (counters or card circles, all worth 1 coin; not real money) in a small pot or bag.
- Class shop (lessons 4 and 5): a table, the 10 market price cards from lesson 3 propped up as shop labels, and paper or card stand-ins for each good (kite, book, apple, bread, wool, jar of honey, pencil, ball, banana, cup). Only 3 kite stand-ins.
- Per pair: a benefit / cost mat with two columns (picture: a smiling face, "what I get"; picture: an empty hand, "what I give up").
- Story choice cards (lesson 5; 4 cards; text in lesson 5).
- Whiteboards and pens, or paper and pencils.
- Sticky notes or name pegs for the closing checks.

⚠ Safety and access

- Not real money. Children never bring money from home and are never asked what their family buys, earns or cannot afford. Every shopping choice is made with the same 10 pretend coins, or on behalf of a story character.
- Scarcity is taught with kites and story goods, not food children need. If a real food is used as a stand-in (for example a real apple for display), nobody eats it; check allergies anyway.

- The hole punch is used by an adult. Scissors, if used for the bookmarks, are child-safe.
- Jobs: show people of different genders, ages and appearances on every card. Avoid "this is a job for boys/girls". Never ask children about the jobs of people at home.
- Access: every card has a picture; children can answer by pointing, sorting, signing, using an AAC device or eye-pointing, and their own way counts. Large-print and tactile versions of the price cards (raised numbers made with glue or stickers) help low-vision and blind children. Coins can be real counters so they can be felt and counted. In the shop, the table is at a height a wheelchair user can reach, and a partner can carry goods on request.
- Colour is never the only way to tell a card apart: "made here" and "came from elsewhere" each have their own picture.

Assessment

There is no test. The closing checks give a quick picture each lesson. During lesson 5, take about 3 minutes with each child, one at a time (spread over the week while others work in the shop), with these cards in front of them:

1. Show the Mouse card from the clean-up story. "Mouse isn't the mayor. How did Mouse help Little Hill?" (Any part from the story, for example lent rakes and gloves.) - outcome 1.
2. Show the potter card. "What does a potter need to know or be good at?" (For example shaping clay, using the kiln safely.) "How could they have learned it?" (Watching, practising, a teacher, a book.) - outcome 2.
3. Show the honey (6 coins) and banana (3 coins) price cards. "Which costs more?" (Honey.) "Which came from somewhere else?" (Banana; it has the ship picture.) - outcome 3.
4. "The shop has 2 balls and 5 children want one. What could they do?" (Any sensible way: take turns, share a game, pick names, wait for more.) - outcome 4.
5. Show story choice card 2 (Goat buys the book). "What did Goat get? What did Goat give up?" (Got the book; gave up the kite, or the 8 coins.) - outcome 5.

Record "yes / with help / not yet" per outcome. This is a check, not a test; accept any sensible answer in the child's own words.

Sources

The C3 framework was read in the archived PDF (pages with the K-2 civics and economics indicators): https://web.archive.org/web/20220403055307/https://www.socialstudies.org/sites/default/files/2017/Jun/c3-framework-for-social-studies-rev0617.pdf

The indicators used, quoted from the framework:

- D2.Civ.2.K-2: "Explain how all people, not just official leaders, play important roles in a community." (Lesson 1.)
- D2.Eco.1.K-2: "Explain how scarcity necessitates decision making." (Lesson 4.)
- D2.Eco.2.K-2: "Identify the benefits and costs of making various personal decisions." (Lesson 5; "personal decisions" are made with pretend coins or for story characters, see Safety.)
- D2.Eco.3.K-2: "Describe the skills and knowledge required to produce certain goods and services." (Lesson 2.)
- D2.Eco.4.K-2: "Describe the goods and services that people in the local community produce and those that are produced in other communities." (Lesson 3.)

- D2.Eco.5.K-2: "Identify prices of products in a local market." (Lesson 3.)

The C3 framework is a framework, not a set of lessons; the stories, Little Hill, characters, goods and prices are the author's own examples, not from a source.

Known gaps and cautions

- Gemini 4 Argon text-checked this unit at c181ab1 on 2026-11-10 and reported no errors (see PEERCHECKS.md). That is a text check by an AI agent, not a teacher review or classroom test.
- Little Hill, its people and every price are made up. Prices are in "Little Hill coins", all worth 1, so the unit does not depend on any country's money; real coins and notes are left for grade 2 maths term 3.
- "Benefits and costs" is taught only as "what I get / what I give up". The wider idea of opportunity cost is left for later grades.
- "Made here / came from elsewhere" uses one clear picture per card. Real goods are often made from parts from many places; this is mentioned to the class once in lesson 3 but not taught.
- Sorting who gets a scarce kite can stir real feelings about fairness. The lesson uses story characters first and the class shop second, and nobody's real wishes or belongings are discussed.
- The society progression lists "swapping and buying" for grade 2; this unit teaches buying with pretend coins only. Swapping (trading one good for another) is not taught here.
- The kinds of jobs and who does them differ between places; change the job cards to fit your area.

Lesson 1: Everyone has a part

Unit overview - Next: Lesson 2

About 40 minutes.

Goal

Children explain, using a made-up story, how people who are not leaders help a community, and what would happen if they did not.

Materials

- 6 large picture story cards for "The Park Clean-Up" (text below).
- Per pair: 6 helper cards: Mayor Hen, Duck (a child), Mouse (a neighbour), Goat (the shopkeeper), Bear (a volunteer), Remy (the bin collector).
- Whiteboards and pens, or paper and pencils.
- Sticky notes or name pegs for the closing check.

Steps

✎ Opening (5 min)

Remind the class of grade 1: "In Little Hill we met a baker, a bus driver, a nurse... Who is in charge of a town?" Take ideas (a mayor, a council, a leader). "Today we find out whether the leader can do everything alone."

✎ Main activity (25 min)

1. **The story (8 min).** Read "The Park Clean-Up" (the author's own story, not from a source), showing each card:
2. After a big storm, the Little Hill park is full of branches and rubbish. The swing is broken. Nobody can play.
3. Duck walks past on the way to school and sees the broken swing. Duck tells Mayor Hen.
4. Mayor Hen says, "The town will mend the swing. But we need help to clear the park." She puts a notice on the board: "Clean-up, Saturday morning."
5. Mouse, who lives next to the park, lends rakes and gloves. Goat, who runs the shop, gives bin bags.
6. On Saturday, Bear and lots of neighbours come. They rake, pick up and fill the bags. Remy, the bin collector, takes the full bags away in the bin lorry.
7. By lunchtime the park is clear, the swing is mended, and everyone plays.
8. **Who did what (10 min).** Pairs lay out the 6 helper cards and, for each one, say what that person did. Walk round and ask: "Which of these people is a leader?" (Mayor Hen.) "Which are not?" (All the others.)
9. **Take one away (7 min).** Turn one helper card face down. "What if Duck hadn't told anyone?" (Nobody might have known the swing was broken.) "What if Remy hadn't

come?" (The full bags would still be in the park.) Pairs try two more cards and tell the class.

✓ Discussion questions (5 min, with answers)

1. "Did Mayor Hen clean the park by herself?" (No. She asked for help and the town mended the swing; many other people did the clearing.)
2. "Duck is a child. Was Duck's part important?" (Yes; Duck noticed the problem and told someone, so it got fixed.)
3. "Remy was doing a job. Bear was helping for free. Are both important?" (Yes. Some people help as their job, some as volunteers, which means helping without being paid.)

✓ Closing check (5 min, with answers)

Each child picks one helper card who is not Mayor Hen and tells a partner (or the adult) what that person did and what would happen without them. Mark with a sticky note or peg who could do it. (Any matching answer from the story.)

Vocabulary

community, leader, mayor, volunteer, notice, help

Differentiation

- Support: use 3 helper cards only (Duck, Mouse, Remy); the adult retells each one's part with the picture.
- Extension: draw a new helper card for the story (for example someone who fixed the swing) and say what they did.
- Children can answer by pointing, signing, AAC or acting out the part; their own way counts.

⚠ Safety

- Keep the story about Little Hill. Do not ask children what their families do for the community, or who they know.

Teacher notes and misconceptions

- Some children think the leader does all the work, or that only paid jobs count. The "take one away" step is there to show every part matters.
- "Volunteer" may be new; keep the meaning simple: "helping without being paid".

Lesson 2: Skills for goods and services

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 40 minutes.

Goal

Children say what someone needs to know or be good at to make a good or give a service, and one way they could have learned it. They make one good and give one service themselves.

Materials

- Per pair: the 8 grade 1 job cards (baker, bus driver, nurse, librarian, farmer, bin collector, builder, hairdresser) plus 4 new ones: potter, cook, vet, mechanic.
- Per pair: a "how did they learn it?" mat with four pictures: watching someone, practising, a book, a teacher or course.
- Strips of card about 5 cm by 20 cm (one per child), crayons, a hole punch (adult only) and short lengths of wool, for bookmarks.
- A tray of mixed classroom pencils and crayons, and the class's labelled pots, for the service.
- Whiteboards and pens, or paper and pencils.
- Sticky notes or name pegs for the closing check.

Steps

✎ Opening (5 min)

Hold up the baker card. "Last year we said a baker makes goods. Which goods?" (Bread, cakes.) "What does a baker need to know to make bread?" (How much flour and water, how long to bake it.) "Were they born knowing that?" (No; they learned it.)

✎ Main activity (25 min)

1. **Skills and knowledge (10 min).** Pairs take the 4 new job cards. For each one, say "goods or service?" and one thing that person needs to know or be good at. Model the potter: "A potter makes cups and bowls, so goods. A potter needs to know how to shape clay and how to use the kiln (a very hot oven) safely." Then pairs do cook, vet and mechanic. (Cook: goods, meals; knows recipes, cooks safely. Vet: service, looks after sick animals; knows about animals' bodies. Mechanic: service, fixes cars and bikes; knows how engines and brakes work.)
2. **How did they learn it? (5 min).** Pairs put each of the 4 cards on the picture that shows one way that person could have learned. Any picture is right if they can say why; most jobs use more than one.
3. **We make a good, we give a service (10 min).** Half the class makes a bookmark: draw a pattern on a card strip; the adult punches a hole and the child ties on wool. The other half gives a service: sorting the tray of mixed pencils and crayons back into the

right labelled pots. Swap after 5 minutes. Ask: "Which one made a thing you can hold?" (The bookmark.) "What did you need to be good at to sort the pots?" (Knowing which goes where, being careful.)

✓ Discussion questions (5 min, with answers)

1. "Is a mechanic's work goods or a service?" (A service: they fix things for people.)
2. "Can someone learn a job in more than one way?" (Yes; for example by watching, practising and having a teacher.)
3. "What did you learn to do today that you could get better at with practice?" (Any answer, for example tying the wool or sorting quickly.)

✓ Closing check (5 min, with answers)

Show the vet card. Each child tells a partner or the adult one thing a vet needs to know or be good at. (For example how to look after animals, how to tell an animal is ill, being gentle.) Mark who could do it.

Vocabulary

goods, services, skill, knowledge, learn, practise, potter, kiln, vet, mechanic

Differentiation

- Support: use only the potter and vet cards; the adult names one skill and the child points to the matching "how did they learn it?" picture.
- Extension: choose a grade 1 job card and list two skills and one piece of knowledge it needs.
- Children can make the bookmark with chunky crayons, stickers or a partner's help; any pattern counts.

⚠ Safety

- The hole punch is used by the adult. Wool lengths are short (about 20 cm).
- Do not ask children which jobs people at home do.

Teacher notes and misconceptions

- "Skill" (something you can do) and "knowledge" (something you know) overlap a lot at this age; accept either.
- Some children think people are born good at jobs. Point back to "how did they learn it?" each time.

Lesson 3: Prices at the Little Hill market

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 40 minutes.

Goal

Children read and compare prices on made-up market price cards, and sort goods into "made in Little Hill" and "came from somewhere else".

Materials

- Per pair: 10 market price cards. Each shows a picture of the good, its price in Little Hill coins, and a small picture: the Little Hill hill for "made here", or a lorry or ship for "came from elsewhere". The goods and prices (the author's own examples, not from a source):

Good	Price	Where from
apple	2 coins	made here (Little Hill orchard)
bread	4 coins	made here (the baker)
wool	5 coins	made here (sheep on the hill)
cup	5 coins	made here (the potter)
honey	6 coins	made here (the beekeeper)
pencil	1 coin	came from elsewhere (lorry)
banana	3 coins	came from elsewhere (ship)
ball	7 coins	came from elsewhere (lorry)
kite	8 coins	came from elsewhere (lorry)
book	8 coins	came from elsewhere (lorry)

- Per pair: a "made here / came from elsewhere" sorting mat (picture of the hill on one side, a lorry and a ship on the other).
- Per child: 10 Little Hill coins (counters or card circles, all worth 1; not real money) in a small pot or bag.
- Whiteboards and pens, or paper and pencils.
- Sticky notes or name pegs for the closing check.

Steps

✎ Opening (5 min)

"In Little Hill there is a market every Saturday. Everything has a price: how many coins you give to get it." Show the apple card. "How many coins?" (2.) Show the kite. (8.) "Which costs more?" (The kite.)

✎ Main activity (25 min)

1. **Read the prices (8 min).** Pairs spread out the 10 price cards and put them in a line from cheapest to dearest. (Pencil 1, apple 2, banana 3, bread 4, wool and cup 5, honey 6, ball 7, kite and book 8.) Ask: "Which two cost the same?" (Wool and cup; kite and book.)
2. **Pay the price (7 min).** The adult calls out a good; each child counts that many coins from their pot onto the table, then puts them back. Try bread (4), honey (6), ball (7). Then "Apple and banana together?" (5 coins.)
3. **Made here or elsewhere (10 min).** Pairs sort the cards onto the mat using the small pictures. (Made here: apple, bread, wool, cup, honey. Elsewhere: pencil, banana, ball, kite, book.) Ask: "Who in Little Hill made the cup?" (The potter, from lesson 2.) "Why does the banana come by ship?" (Bananas grow in warm places, as we said in grade 1, and Little Hill is not warm enough.) Mention once: "Lots of real things are made from parts from many places; our cards just show one picture each."

✓ Discussion questions (5 min, with answers)

1. "Which good made in Little Hill costs the most?" (Honey, 6 coins.)
2. "Can you buy the ball with 5 coins?" (No; it costs 7, so you need 2 more.)
3. "Why might some goods come from somewhere else?" (They can't be grown or made here, or another place makes them; any sensible answer.)

✓ Closing check (5 min, with answers)

Show the bread and wool cards. Each child points to the one that costs more (wool) and says whether bread was made in Little Hill (yes; the hill picture). Mark who could do both.

Vocabulary

price, coins, market, costs more, costs less, cheapest, made here, came from elsewhere

Differentiation

- Support: use 5 cards only (pencil, apple, bread, honey, banana); count coins with an adult.
- Extension: choose two goods that cost exactly 10 coins together (for example bread and honey, or kite and apple), and find another pair.
- Large-print or tactile price cards with raised numbers, and counters that can be felt, for low-vision and blind children; children can show an answer by pointing, signing, AAC or pushing coins.

⚠ Safety

- Coins are counters, never real money. Do not ask what things cost at home or what families buy.

Teacher notes and misconceptions

- Some children think a bigger thing must cost more. The kite (8) and the book (8) cost the same although they are different sizes; the pencil is small and cheap but the cup is small and costs 5. Ask "How do you know?" and point at the number.
- All coins are worth 1 here. Real coins with different values come in grade 2 maths term 3.

Lesson 4: Not enough to go round

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 40 minutes.

Goal

Children explain that when there is not enough of something, people have to decide who gets it or what to buy, and they suggest a fair way to decide.

Materials

- 5 helper cards from lesson 1: Duck, Mouse, Goat, Bear, Remy.
- Class shop: a table, the 10 market price cards from lesson 3 propped up as shop labels, and paper or card stand-ins for each good (kite, book, apple, bread, wool, jar of honey, pencil, ball, banana, cup). Only 3 kite stand-ins; several of each other good.
- Per child: 10 Little Hill coins (not real money) in a small pot or bag.
- Whiteboards and pens, or paper and pencils.
- Sticky notes or name pegs for the closing check.

Steps

✎ Opening (5 min)

Put 3 kite stand-ins on the table. Lay out 5 helper cards. "It's a windy day. Duck, Mouse, Goat, Bear and Remy all want a kite. How many kites are there?" (3.) "Is that enough?" (No; 2 friends would have none.) "When there isn't enough of something for everyone who wants it, we say it is scarce."

✎ Main activity (25 min)

1. **How could they decide? (10 min).** Pairs talk, then share ideas. Write or draw each idea. Likely ideas: first come, first served; pick names from a hat; take turns flying; share one kite between two; wait until the shop gets more; whoever pays more. For each one ask: "Is that fair? Which kind of fair from grade 1 is it?" (Taking turns, equal shares, or giving to whoever needs it most.) There is no one right answer; the point is that somebody has to decide.
2. **Our class decides (5 min).** The class has more children than kites. Agree one way to decide who may take a kite stand-in in the shop today (for example taking turns over lessons 4 and 5). Write it on the board.
3. **10 coins (10 min).** Each child has 10 coins. In small groups at the shop, each child chooses goods and pays the price on the label (with the class's kite rule). Before they start: "Could you buy the kite and the book?" (No; 8 and 8 is 16, more than 10.) After shopping, each child counts the coins left and puts the goods back.

✓ Discussion questions (5 min, with answers)

1. "Why did we need a rule for the kites but not for the pencils?" (There were enough pencils for everyone; there were not enough kites.)
2. "With 10 coins, could anybody buy everything in the shop?" (No; the goods cost much more than 10 coins together, so everyone had to choose.)
3. "What if the shop had 30 kites?" (Then nobody would need to decide who gets one.)

✓ Closing check (5 min, with answers)

"The library has 1 copy of a new book and 4 children want to read it. What could they do?" Each child tells a partner or the adult one way to decide. (Any sensible way: take turns, read it together, pick names, wait for another copy.) Mark who gave a way.

Vocabulary

scarce, not enough, decide, choose, fair, take turns, first come first served

Differentiation

- Support: act out the kite problem with 3 kites and 5 children; the adult offers two ways to decide and the child picks one.
- Extension: write or draw a rule for a scarce thing in the classroom (for example the one class computer or a favourite book).
- Children can choose goods by pointing, signing, AAC or with a partner who carries them; the shop table is at a height a wheelchair user can reach.

⚠ Safety

- The goods are paper or card stand-ins; nothing is eaten.
- Some children feel strongly about not getting a kite. Remind the class of the rule they agreed and that kite turns continue in lesson 5. Nobody's real belongings or wishes are discussed.

Teacher notes and misconceptions

- "Paying more" is a real way that markets decide who gets scarce things. If children suggest it, note that it is one way and ask whether it is fair to someone with fewer coins; do not push a single answer.
- Scarcity is not only about money: time, space and turns on the computer can be scarce too.

Lesson 5: Choosing, and what you give up

Unit overview - Previous: Lesson 4

About 40 minutes, plus about 3 minutes per child for the private check (spread over the week).

Goal

Children name one benefit (what you get) and one cost (what you give up) of a choice made by a story character, and make their own choice in the class shop with pretend coins.

Materials

- 4 story choice cards (text below; the author's own examples, not from a source).
- Per pair: a benefit / cost mat with two columns (picture: a smiling face, "what I get"; picture: an empty hand, "what I give up").
- Class shop from lesson 4: table, the 10 price cards as labels, paper or card stand-ins for each good, 3 kite stand-ins, and the class's kite rule.
- Per child: 10 Little Hill coins (not real money) in a small pot or bag.
- For the private check: the Mouse helper card (lesson 1), the potter job card (lesson 2), the honey and banana price cards (lesson 3), and story choice card 2.
- Whiteboards and pens, or paper and pencils.
- Sticky notes or name pegs for the closing check.

Steps

✎ Opening (5 min)

"Last time, nobody could buy everything with 10 coins. So every time we choose, we get something and we give something up." Show the mat. "What I get is the benefit. What I give up is the cost."

✎ Main activity (25 min)

1. **Story choices (12 min).** Read each card; pairs put a picture or word in each column of the mat, then share.
2. Duck has 10 coins. Duck buys a kite (8 coins) and an apple (2 coins). (Benefit: a kite to fly and an apple. Cost: all 10 coins; Duck can't buy the book this week.)
3. Goat has 10 coins and wants the kite and the book, which cost 8 coins each. Goat chooses the book. (Benefit: the book. Cost: the kite, and 8 coins.)
4. Mouse can finish a painting or go to the park with friends before tea. Mouse finishes the painting. (Benefit: the painting is done. Cost: missing the park this time.) "A cost isn't always coins; it can be time."
5. Mayor Hen has enough town money for a new swing or a new bench in the park, not both. The town chooses the swing. (Benefit: more children can play. Cost: no new bench to sit on.)

6. **Shop round (13 min).** Small groups visit the class shop, using the class kite rule from lesson 4. Before paying, each child tells a partner "I'm buying ___; I'm giving up ___." The partner listens and checks the price. Goods go back afterwards. Meanwhile, start the private checks (see the unit overview).

✓ Discussion questions (5 min, with answers)

1. "Did Goat make a wrong choice?" (No; Goat chose what mattered most to Goat. Different people can make different choices.)
2. "Is a cost always money?" (No; it can be time, or another thing you could have had, like Mouse's trip to the park.)
3. "Why did Mayor Hen have to choose?" (The town didn't have enough money for both; there wasn't enough, like the kites.)

✓ Closing check (5 min, with answers)

Read: "Bear has 10 coins and buys the ball for 7 coins." Each child tells a partner or the adult one benefit (the ball) and one cost (7 coins, or another thing Bear could have bought). Mark who named both.

Vocabulary

choice, choose, benefit, cost, give up, decide

Differentiation

- Support: use story cards 1 and 2 only; the adult asks "What did Duck get?" and "What can't Duck have now?" as two separate questions.
- Extension: make a new story choice card for a Little Hill character and fill in the mat.
- Children can show benefit and cost by sorting pictures, pointing, signing or AAC; their own way counts.

⚠ Safety

- Only story characters and pretend coins. Never ask what children or their families spend money on, or what they had to give up at home.

Teacher notes and misconceptions

- Children often think "cost" only means the price. Card 3 has no money at all, so it helps show that time and other choices are costs too.
- Keep choices neutral: there is no "right" good to buy.

Grade 2 Society: How Letters Changed: Sources, the First Stamps and the People Who Changed Them (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 11 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every activity against your school's rules.
>
> Text-checked by two other agents (Gemini 4 Carbon, Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 2. Builds on grade 1: Then and now: timelines and old and new objects and the society progression

Big idea

Some parts of life change and some stay the same. People have always wanted to send news to someone far away, but the ways messages travel, and who pays for them, have changed. We can find out about a change from sources, and we can ask questions about the people and groups who helped to make it happen. A big change is usually the work of many people, not just one, and one change can lead to another.

This is the second society unit of grade 2 (term 2). It builds on the grade 1 unit Then and now: timelines and old and new objects (three time bands, kinds of source, museum-style labels). Grade 2 adds one real change with real dates (paying for letters in the United Kingdom, and the first sticky postage stamp in 1840), the people and groups behind it, reasons for a change, and two different accounts of the same event.

Outcomes

By the end of the unit most children can:

1. Sort picture cards of ways of sending a message into long ago, when today's grown-ups were small, and now, give one clue for a choice, and say one thing that changed and one thing that stayed the same.
2. Name at least three kinds of source (an object, a picture, a piece of writing, a label) and, from a made-up source read aloud by an adult, find who made it, where and when, and ask one question about it.
3. Say who usually paid for a letter in the United Kingdom before 1840 (the person who received it) and who paid after (the person who sent it, with a stamp).
4. Ask one question about a person or group who helped make the change, and say that more than one person helped.
5. Give one possible reason why the change happened, and put four dated cards about the change in time order with help.
6. Compare two made-up accounts of the same event and say one way they are different.

Prior knowledge

- Grade 1 society term 2: first, next, before, after; three time bands; kinds of source; museum-style labels.
- Grade 2 society term 1: everyone in a community plays a part; goods and services; prices (made-up coins).
- Grade 2 mathematics term 2: counting and comparing numbers, used for the pretend coins. The years on the timeline cards (1835 to 1841) are read aloud by the adult; children do not need to read four-digit numbers.
- No reading is needed. Every card has a picture; words on cards are for the adult.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week.

1. Sending a message, then and now: Hen's letter and Duck's message; sorting message picture cards into three time bands; what changed and what stayed the same.
2. What can a source tell us?: a made-up Little Hill source pack (a folded letter, Mouse's diary page, a museum label, an unused envelope); finding maker, place and date; asking questions of a source.
3. Who paid for a letter?: the real change in the United Kingdom in 1840; playing the old way and the new way with pretend coins; the Penny Black.
4. Who helped make the change?: "Who helped?" cards about real people and groups; building questions with who, what, why and how; how people might have felt then.
5. One change leads to another: the cancel-mark problem and the Penny Red; a class timeline; two made-up accounts of the day stamps came to Little Hill.

Materials (whole class unless noted)

- Three time-band cards from grade 1: "long ago", "when today's grown-ups were small", "now" (lesson 1, lesson 5).
- Six message picture cards, drawn by the teacher from the descriptions in lesson 1 (lesson 1).
- A large "Changed / Stayed the same" chart on the board or on paper (lesson 1, lesson 5).
- Made-up source pack, one copy per group of four, made from the text in lesson 2: a picture of Hen's folded letter, Mouse's diary page, a museum label for a mail bag, and an unused, unaddressed envelope (lesson 2).
- "Maker / Place / Date" card for each group (lesson 2).
- Sticky notes or paper slips and pencils (lessons 2, 4).
- Large swallow-safe counters as pretend coins, about 10 per pair (lesson 3).
- Paper "letters": scrap paper folded once, some single sheets and some double sheets (lesson 3).
- Two floor signs, "Near" and "Far", with a picture (lesson 3).
- Paper squares about 3 cm across, cut by an adult, as pretend stamps, and glue sticks (lesson 3).
- A printed picture of the Penny Black and, for lesson 5, the Penny Red. The stamps are from 1840 and 1841; pictures of them are on their Wikipedia pages. Check the licence page of any picture you print (lessons 3, 5).
- A globe or world map, if the class has one (optional; lesson 3).
- Five "Who helped?" cards, from the text in lesson 4 (lesson 4).

- Question starter cards: Who? What? Why? How? What if? (lesson 4).
- A "Question wall": a large sheet for sticky notes (lessons 4, 5).
- Four dated timeline cards and one "now" card, from the text in lesson 5 (lesson 5).
- Two made-up account cards, Mouse's and Goat's, from the text in lesson 5 (lesson 5).
- For blind or low-vision children: raised-line versions of the message cards and time-band cards (glue string or puffy paint on the outline), a real folded paper letter and a real envelope to hold, and a stamp-sized paper square to feel (all lessons).

⚠ Safety and access

- **Privacy.** Never ask who children send messages to, whether their family has a phone or computer, what their address is, or how much their family spends. Every letter, address and account in this unit belongs to a made-up Little Hill character. Envelopes stay unaddressed.
- **Nothing is licked.** Pretend stamps are paper squares stuck with a glue stick. Do not use real lick-and-stick stamps or envelopes.
- Counters are large enough not to be swallowed; check with your school's rules for the age group. Adults cut the paper squares.
- Movement to the "Near" and "Far" signs in lesson 3 is walking only; a child can stay seated and send a partner, or point.
- Children can answer by speaking, signing, pointing, using AAC, drawing, or with a partner who writes for them. Their own way counts.
- Deaf children: show every picture card while it is described, and face the class when reading sources aloud. Blind and low-vision children: use the raised-line cards and real objects listed in Materials; describe each picture in words. Colour is never the only clue (the Penny Black and Penny Red are also told apart by name and story).
- Some children may know that the stamps show a queen. Say who she was in one sentence (lesson 3) and do not ask for opinions about kings and queens.

Assessment

Watch and listen during lessons, and use the closing checks. During lesson 5 or the following week, see each child for about 3 minutes with the cards (answers in brackets):

1. "Put these three in order: long ago, when grown-ups were small, now." Use the walking-letter card, the wall-phone card and the screen card. "Tell me one clue." (Walking letter, wall phone, screen; any sensible clue, such as "no screens long ago". Accept the wall phone in either of the first two bands with a reason.) Then: "One thing that changed? One thing that stayed the same?" (Changed: how fast, how it travels, who carries it. Same: people still send news to people far away.) (Outcome 1.)
2. Read the mail-bag label aloud: "Who made it? Where? When?" (The Little Hill leather shop; Little Hill; long ago, about the time of the first stamps.) "What kind of source is it?" (A label; the bag is an object.) "Ask me one question about the bag." (Any question.) (Outcome 2.)
3. "Long ago in the United Kingdom, before stamps, who usually paid for a letter? After 1840, who paid?" (The person who got it; the person who sent it, with a stamp.) (Outcome 3.)
4. "Ask me one question about someone who helped make the change." "Was it one person or more than one?" (Any question about a person or group; more than one.) (Outcome 4.)

5. "Why do you think they changed it?" (Any sensible reason: it was cheaper, simpler, fairer, so people would send more letters.) With the four dated cards read aloud: "Put them in order." (1835 Wallace, 1837 Hill's idea, 1840 Penny Black, 1841 Penny Red.) (Outcome 5.)
6. "Mouse and Goat told the story of the same day. Tell me one way their stories are different." (Mouse was happy not to collect coins; Goat did not like paying first, or similar.) (Outcome 6.)

Record "yes", "with help" or "not yet" for each outcome. A child who can do it in their own way (pointing, signing, AAC) gets "yes".

Sources

The C3 framework was read in the archived PDF (pages with the K-2 history indicators): https://web.archive.org/web/20220403055307/https://www.socialstudies.org/sites/default/files/2017/Jun/c3-framework-for-social-studies-rev0617.pdf

The indicators used, quoted from the framework:

- D2.His.1.K-2: "Create a chronological sequence of multiple events." (Lesson 5.)
- D2.His.2.K-2: "Compare life in the past to life today." (Lessons 1, 3.)
- D2.His.3.K-2: "Generate questions about individuals and groups who have shaped a significant historical change." (Lesson 4.)
- D2.His.4.K-2: "Compare perspectives of people in the past to those of people in the present." (Lesson 4.)
- D2.His.6.K-2: "Compare different accounts of the same historical event." (Lesson 5; the accounts are made up, see Known gaps.)
- D2.His.9.K-2: "Identify different kinds of historical sources." (Lesson 2.)
- D2.His.10.K-2: "Explain how historical sources can be used to study the past." (Lesson 2.)
- D2.His.11.K-2: "Identify the maker, date, and place of origin for a historical source from information within the source itself." (Lesson 2.)
- D2.His.12.K-2: "Generate questions about a particular historical source as it relates to a particular historical event or development." (Lesson 2.)
- D2.His.14.K-2: "Generate possible reasons for an event or development in the past." (Lessons 3, 5.)
- D2.His.16.K-2: "Select which reasons might be more likely than others to explain a historical event or development." (Lesson 3.)

The facts about letters and stamps come from three Wikipedia articles, read on 11 November 2026:

- "Penny Black": https://en.wikipedia.org/wiki/Penny_Black (first issued 1 May 1840, valid from 6 May; the receiver usually paid before, by the sheet and the distance; one penny for a letter up to half an ounce, whatever the distance; about 2,600 design entries, none chosen; Queen Victoria's profile; engraved by Charles Heath and his son Frederick; sheets cut with scissors; red cancel marks were hard to see and easy to remove, so in February 1841 the stamp became the Penny Red and the cancel ink black).
- "Rowland Hill (postal reformer)": https://en.wikipedia.org/wiki/Rowland_Hill_(postal_reformer) (a teacher, inventor and reformer, "usually credited" with the postage stamp; argued that cheaper letters would mean more letters; letters sent in the UK more than doubled in 1840; stamps in Switzerland and Brazil within three years and in 90 countries by 1860).

- "Uniform Penny Post": https://en.wikipedia.org/wiki/Uniform_Penny_Post (Robert Wallace began the campaign for cheap postage in 1835; Hill set out his plan on 13 February 1837).

Little Hill, its characters, the message picture cards, the made-up sources, the pretend prices in lesson 3 and the two accounts in lesson 5 are the author's own examples, not from a source.

Known gaps and cautions

- Two other agents (Gemini 4 Carbon and Gemini 4 Argon, both at 0648eb0) text-checked this unit on 2026-11-11 and reported no errors. Those are text checks by AI agents, not a teacher review or classroom test.
- The real example is from the United Kingdom because those are the sources the author read. Teachers elsewhere may swap in a change from their own country's history, if they have a source for it.
- The two accounts in lesson 5 are made up. D2.His.6 asks for accounts of a historical event; a teacher with real letters or newspaper reports from 1840 could use short read-aloud extracts instead.
- The time-band sorting in lesson 1 uses the author's picture descriptions; the answers given are the author's, and good reasons for other answers count. No dates are claimed for the message pictures.
- The unit does not say how much a penny was worth in 1840 compared with today; the sources read do not say. If children ask, it is a good question for the Question wall.
- Wikipedia is a starting point, not a final authority; a teacher may want to check the dates against a museum or postal-history source.
- Rowland Hill is "usually credited" with the stamp; lesson 4 is written so that children see several people and groups, not one hero.

Lesson 1: Sending a message, then and now

Unit overview - Next: What can a source tell us?

Back to the grade 2 year plan

Goal

Children sort pictures of ways of sending a message into three time bands, give a clue for their choice, and say one thing that changed and one thing that stayed the same.

Materials

- Three time-band cards: "long ago", "when today's grown-ups were small", "now".
- Six message picture cards (see below), drawn by the teacher.
- A large "Changed / Stayed the same" chart.
- For blind or low-vision children: raised-line versions of the message cards and time-band cards, and a real folded paper letter to hold.

The six message picture cards (the author's descriptions, not from a source):

1. A person walking along a path over hills, holding a folded letter.
2. A rider on a horse with a bag of letters.
3. Horses pulling a coach with a bag of letters on the roof.
4. A person at a post box with an envelope that has a stamp on it.
5. A person talking into a telephone fixed to a wall, with a curly cord.
6. A person typing a message on a small screen.

Steps

✎ Opening (5 min)

Tell the story (the author's own): "Long ago in Little Hill, Hen wanted to tell her friend Goat, who lived over the hills at Far Hill, that her eggs had hatched. She wrote a letter, folded it, and Mouse carried it over the hills. It took Mouse two days to get there. Today, Duck in Little Hill wants to tell Goat about a new kite. Duck types a message on a screen, and Goat reads it straight away."

Ask: "What did Hen and Duck both want to do?" (Tell Goat some news.)

✎ Main activity (25 min)

1. Lay the three time-band cards on the floor in order, left to right. Remind the class of grade 1: long ago, when today's grown-ups were small, now.
2. Show each message card in turn and describe it aloud. Give pairs a card.
3. Each pair puts its card in a time band and gives one clue ("There are horses, and nobody has a phone"). Other pairs say whether they agree.

4. Author's suggested sorting (accept other answers with a good reason): cards 1, 2 and 3 long ago; card 4 could be any band (people still post letters); card 5 when today's grown-ups were small, or long ago; card 6 now.
5. Fill in the chart together:
    - Changed: how fast the message gets there; what carries it (feet, horse, coach, wires, screen); who carries it.
    - Stayed the same: people still want to send news to people far away; letters and post boxes are still used.
6. Point at card 4: "Who paid for this letter to travel?" Take guesses and leave the question open: "We will find out in lesson 3."

✓ Discussion questions (5 min, with answers)

- "Why did Hen's letter take two days?" (Mouse walked over the hills; there was no faster way in the story.)
- "Is anything on our 'stayed the same' list still true in Little Hill today?" (Yes: Duck still wanted to tell Goat news.)
- "Is fast always better?" (Any reasoned answer: a letter can be kept and read again; a fast message is good for urgent news.)

✓ Closing check (5 min, with answers)

Hold up card 2 (the rider). Each child tells a partner or the adult one thing that changed and one thing that stayed the same, compared with card 6. (Changed: a horse then, a screen now; slower then. Same: someone is sending news.) Mark who gave both.

Vocabulary

long ago, now, then, change, changed, stayed the same, message, letter, send, carry

Differentiation

- Support: sort only cards 1 and 6 into "long ago" and "now"; the adult offers two clues and the child picks one.
- Extension: draw a seventh card for "now" or "long ago" and give a clue.
- Children can place cards by pointing, signing or AAC, or ask a partner to move them. The time-band cards can go on a table for a wheelchair user.

⚠ Safety

- Do not ask children who they send messages to, or whether their family has a phone or computer. Talk only about Hen, Duck, Mouse and Goat.

Teacher notes and misconceptions

- Children may say "long ago" means "when my teacher was small". Use the three bands to separate the two.
- Card 4 is a deliberate "both" card: some old things are still used. That is a "stayed the same" clue, not a mistake.

Lesson 2: What can a source tell us?

Unit overview - Previous: Sending a message, then and now - Next: Who paid for a letter?

Back to the grade 2 year plan

Goal

Children name kinds of source, find who made a source, where and when, from what is written on it, and ask a question about it.

Materials

- Made-up source pack, one per group of four (text below): a picture of Hen's folded letter, Mouse's diary page, a museum label for a mail bag, and an unused, unaddressed envelope.
- "Maker / Place / Date" card for each group.
- Sticky notes or paper slips and pencils.
- For blind or low-vision children: a real folded paper letter and a real envelope to hold.

The made-up source pack (the author's own, for Little Hill):

1. **Picture of Hen's folded letter.** Draw a sheet of paper folded into a small packet, with no envelope. On the outside write: "To Goat, Top Farm, Far Hill. From Hen, Little Hill. Spring, long ago. Goat to pay 3 coins."
2. **Mouse's diary page.** "Spring, long ago. Little Hill. Today I carried three letters to Far Hill. It took two days. Goat had to pay 3 coins for Hen's letter. He said, 'That is a lot of coins!' My feet are tired. Written by Mouse."
3. **Museum label.** "Mail bag. Made by the Little Hill leather shop. Place: Little Hill. Date: long ago, about the time of the first stamps. Used by Mouse to carry letters."
4. **An unused envelope.** A real, clean envelope with nothing written on it.

Steps

✎ Opening (5 min)

Ask: "In grade 1 we found out about the past from sources. What kinds of source can you remember?" (Objects, pictures, labels, writing, what people remember.) Write the kinds on the board with a small drawing for each.

✎ Main activity (25 min)

1. Give each group the pack. An adult reads each paper source aloud while the group looks at it (or holds it).
2. Groups sort the four sources by kind: picture (Hen's letter), writing (Mouse's diary), label (the museum label), object (the envelope). Accept "writing" for the letter too: it is a picture of writing.

3. **Maker, place, date.** For the letter, the diary and the label, the group finds who made it, where and when, using only the words on it. The adult reads again on request. Answers:
    - Letter: Hen; Little Hill; spring, long ago.
    - Diary: Mouse; Little Hill; spring, long ago.
    - Label: the Little Hill leather shop; Little Hill; long ago, about the time of the first stamps.
4. Ask: "Can the envelope tell us who made it, where or when?" (No: nothing is written on it. A source does not always tell us everything.)
5. **What does it tell us?** Each group chooses one source and says one thing it tells us about Little Hill long ago (Goat paid to get the letter; letters took two days; Mouse carried letters in a bag).
6. **Ask the source a question.** Each group writes or draws one question on a sticky note ("Why did Goat pay and not Hen?", "Who paid Mouse?"). Keep the notes for the Question wall in lesson 4.

✓ Discussion questions (5 min, with answers)

- "Mouse's diary and Hen's letter both say Goat paid 3 coins. Does that help us believe it?" (Yes: two sources agree. It is still a clue, not proof.)
- "What does Mouse's diary tell us that the letter does not?" (It took two days; Mouse's feet were tired; Goat thought it was a lot of coins.)
- "Who paid for Hen's letter?" (Goat, who got it. Ask whether that is the same today and leave it for lesson 3.)

✓ Closing check (5 min, with answers)

Read the label aloud again. Each child shows or tells a partner who made the mail bag, where, and when. (The Little Hill leather shop; Little Hill; long ago, about the time of the first stamps.) Mark who found all three.

Vocabulary

source, object, picture, writing, label, diary, maker, place, date, clue, question

Differentiation

- Support: find only the maker on the label, with the adult pointing to the line.
- Extension: make a label for a classroom object, with maker, place and date (made up or from the object itself).
- Children can answer by pointing, signing, AAC or drawing; a partner can write their question.

⚠ Safety

- Envelopes stay unaddressed. Do not ask children for their own address or anyone else's. All names and places are Little Hill ones.

Teacher notes and misconceptions

- Children may think a source is always true. Mouse's diary is one person's view; "a lot of coins" is Mouse's and Goat's opinion.
- The sources in this lesson are made up for practice. Say so to the class: "These are pretend sources from Little Hill. In lesson 3 we look at a real change."

Lesson 3: Who paid for a letter?

Unit overview - Previous: What can a source tell us? - Next: Who helped make the change?

Back to the grade 2 year plan

Goal

Children learn a real change: in the United Kingdom before 1840 the person who received a letter usually paid for it, by the distance and the number of sheets; from 1840 the sender paid one penny with a small sticky stamp. They play both ways and suggest reasons for the change.

Materials

- Large swallow-safe counters as pretend coins, about 10 per pair.
- Paper "letters": scrap paper folded once, some single sheets and some double sheets.
- Two floor signs, "Near" and "Far", with a picture.
- Paper squares about 3 cm across, cut by an adult, as pretend stamps, and glue sticks.
- A printed picture of the Penny Black (check its licence page).
- A globe or world map, if the class has one (optional).
- For blind or low-vision children: a stamp-sized paper square to feel, and a real folded paper letter.

Steps

✎ Opening (5 min)

Remind the class: in Little Hill, Goat paid for Hen's letter. Say: "That part of the story is pretend, but something like it really happened. Long ago in a real country, the United Kingdom, the person who got a letter usually paid for it when it arrived."

✎ Main activity (25 min)

1. **The old way (before 1840).** Put the "Near" and "Far" signs at two ends of the room. Pairs take turns: one is the sender, one the receiver. The sender hands the letter to the adult, who "carries" it to the receiver at "Near" or "Far". The receiver pays the adult in pretend coins using the class rule (made up for this game, not real prices):
    - Near: 1 coin. Far: 3 coins.
    - A double sheet costs 1 more coin. Pairs count what they paid after three letters.
2. **Tell the real story** (from the Wikipedia articles listed in the unit Sources): "In the United Kingdom, nearly 200 years ago, the price of a letter depended on how far it went and how many sheets of paper it had, and the person who got it usually paid. Then there was a big change. From May 1840, a letter that was not too heavy cost one penny to send anywhere in the country, near or far. The person sending it paid, and stuck on a small paper stamp to show it was paid. The first stamp was called the Penny Black." Show the picture. "The face on it is Queen Victoria, who was the queen of the United Kingdom then."

3. **The new way (from 1840).** Play again. Now the sender pays the adult 1 coin before sending, near or far, and glues a pretend stamp on the letter. The receiver pays nothing. Pairs count again.
4. Compare the two rounds on the board: who paid, how many coins, and how long it took to play each round.
5. **Why change?** Pairs give one possible reason for the change. Write every reason on the board (simpler, fairer for people far away, the carrier did not have to collect coins at every door, cheaper so people might send more letters).
6. **Which reason is more likely?** Tell the class one clue from the sources: the man usually credited with the idea, Rowland Hill, argued that if letters were cheaper, people would send more; and in 1840, the first year, the number of letters sent in the United Kingdom more than doubled. Ask: "Which of our reasons does that clue help?" (Cheaper so people send more.) Say that the other reasons may also be true; a clue makes one reason more likely, it does not make the others wrong.

✓ Discussion questions (5 min, with answers)

- "In the old way, who paid more: someone near or someone far?" (Far.)
- "Why did the letter need a stamp in the new way?" (To show it was already paid.)
- "How is that different from Hen's letter in Little Hill?" (Goat, who got it, paid. In the new way the sender pays.)

✓ Closing check (5 min, with answers)

Each child shows or tells the adult: "Before 1840, who usually paid for a letter? After 1840, who paid?" (The person who got it; the person who sent it, with a stamp.) Mark who gave both.

Vocabulary

pay, sender, receiver, stamp, penny, price, near, far, the United Kingdom, reason

Differentiation

- Support: play only near letters, one round each way; the adult says "you pay" or "they pay" with a gesture.
- Extension: work out how many coins Goat would pay for a far letter with a double sheet in the old way (3 + 1 = 4).
- A child can stay seated and send a partner to the signs, or point to "Near" or "Far" on a card. Pretend stamps can be pressed on by an adult for a child who prefers not to use glue.

⚠ Safety

- Nothing is licked; stamps are paper squares with a glue stick.
- Counters are large and swallow-safe; collect and count them at the end.
- Walking only between the signs; keep the path clear.

- Do not ask about money at home or how much real stamps cost a family.

Teacher notes and misconceptions

- The near/far prices in the game are made up. The real old prices were more complicated; the sources read for this unit do not give a simple table.
- Children may think a penny then was the same as a penny now. The sources read do not say what it was worth; put the question on the Question wall.
- "The United Kingdom" can be shown on a globe or world map if the class has one, without discussing anyone's home country.

Lesson 4: Who helped make the change?

Unit overview - Previous: Who paid for a letter? - Next: One change leads to another

Back to the grade 2 year plan

Goal

Children hear about several real people and groups who helped make the change to stamps, ask questions about them, and think about how people then might have seen letters differently from people now.

Materials

- Five "Who helped?" cards (text below), each with a simple drawing (a person speaking, a person writing, a pile of drawings, two people carving). The facts are from the Wikipedia articles in the unit Sources.
- Question starter cards: Who? What? Why? How? What if?
- The Question wall, with the sticky notes from lesson 2.
- Sticky notes or paper slips and pencils.

The "Who helped?" cards:

1. **Robert Wallace.** In 1835 he told a group set up by the government that if more people used the post, the post would earn more money. He started the campaign for cheaper letters.
2. **Rowland Hill.** A teacher and inventor. In 1837 he set out a plan for letters to be paid for before they were sent, with a stamp. He is usually given the credit for the postage stamp.
3. **Henry Cole.** He worked with Rowland Hill and helped run a competition for people to design the new stamps.
4. **The people who sent designs.** About 2,600 designs were sent in. None of them was chosen; a simple design that Hill liked, with the queen's face, was used instead.
5. **Charles Heath and his son Frederick.** They engraved the queen's face: they cut the picture into metal so that it could be printed.

Steps

✎ Opening (5 min)

Ask: "Last lesson, who did I say was usually given the credit for the stamp?" (Rowland Hill.) "Do you think one person did it all?" Take a quick show of hands; do not say the answer yet.

✎ Main activity (25 min)

1. Read each "Who helped?" card aloud and show its drawing. Put the cards in a row on the board.
2. Ask again: "One person or many?" (Many: at least five people or groups on our cards, and others we do not know about.) Ask who else might have helped (people who

carried letters, printers, people who sold stamps). Say: "Those are good guesses. We would need a source to know more about them."

3. **Question builder.** Groups of four get one card each (one group may get two) and the question starter cards. Each child makes one question about their person or group, using a starter. Examples: "Why did Robert Wallace want cheaper letters?", "How did Charles Heath cut the picture?", "What if nobody had sent any designs?" An adult writes or the child draws.
4. Groups stick their questions on the Question wall next to their card. Add the lesson 2 notes too.
5. Sort the wall together into "Our cards can answer this" and "We need another source". Answer the first kind together from the cards.

✓ Discussion questions (5 min, with answers)

These ask how people might have seen things, so there is no single answer.

- "Long ago, if a letter from far away came and you had to pay a lot, how might you feel?" (Happy to get news, but worried about paying; any reasoned answer.)
- "When the price became one penny, who might have been pleased?" (People who lived far from their friends; people who wanted to send more letters; the carriers, who did not have to collect coins.)
- "Today, how might someone feel getting a message? Is that the same or different?" (Any reasoned answer; people then and now both like news.)

✓ Closing check (5 min, with answers)

Each child tells or shows the adult one question about a person or group on the cards, and answers: "Was it one person or more than one?" (Any question about a person or group; more than one.) Mark who did both.

Vocabulary

question, who, what, why, how, credit, design, competition, engrave, group

Differentiation

- Support: choose a question starter card and point to a person; the adult helps build the question aloud.
- Extension: write two questions, one that the cards can answer and one that needs another source.
- Questions can be signed, said with AAC or drawn; a partner can write them.

⚠ Safety

- Talk about the people on the cards and Little Hill characters only. Do not ask about family members who work in a post office or about anyone's letters at home.

Teacher notes and misconceptions

- "Usually given the credit" is the source's wording. It helps children see that history books choose whom to name, and that others helped too.
- Keep to what the cards say. If a child asks something the cards cannot answer, it belongs on the "We need another source" side; do not guess an answer as if it were a fact.

Lesson 5: One change leads to another

Unit overview - Previous: Who helped make the change?

Back to the grade 2 year plan

Goal

Children hear how the first stamp caused a new problem that led to another change, put dated cards in time order, and compare two made-up accounts of the same event.

Materials

- Printed pictures of the Penny Black and the Penny Red (check their licence pages).
- Four dated timeline cards and one "now" card (text below), each with a drawing.
- Three time-band cards from lesson 1.
- Two made-up account cards, Mouse's and Goat's (text below).
- The "Changed / Stayed the same" chart from lesson 1, and the Question wall.
- For blind or low-vision children: a stamp-sized paper square to feel, and the account cards read aloud.

The timeline cards (facts from the Wikipedia articles in the unit Sources):

- **1835:** Robert Wallace starts the campaign for cheaper letters.
- **1837:** Rowland Hill sets out his plan for paid-in-advance letters with a stamp.
- **1840 (May):** the Penny Black, the first sticky postage stamp, is used.
- **1841 (February):** the stamp changes to the Penny Red, and the ink for marking used stamps changes to black.
- **Now:** a picture of a post box and a screen.

The two accounts (made up by the author, about Little Hill):

- **Mouse's account.** "The day stamps came to Little Hill was the best day! Everyone pays when they send a letter now, so I do not have to wait at every door for coins. My bag was full of letters."
- **Goat's account.** "The day stamps came to Little Hill was a muddle. Now I have to pay before I send a letter, and I have to cut each stamp off the sheet with scissors. But I do like getting Hen's letters without paying."

Steps

✎ Opening (5 min)

Show the Penny Black. "When a letter was posted, workers marked the stamp so it could not be used again. On the Penny Black they used red ink." Ask: "Can you see a problem?" Give a clue if needed: red on black is hard to see.

✎ Main activity (25 min)

1. **The next change** (10 min). Tell the class: "The red marks were hard to see on the black stamp, and the red ink was easy to wash off. So some people could use a stamp again. In February 1841 the stamp was changed to red, the Penny Red, and the marking ink was changed to black." Show the Penny Red. Ask: "Why did they change the colours?" (So the mark was easy to see and hard to wash off.) Add to the chart: one change led to another.
2. **Timeline** (7 min). Read the four dated cards aloud, one at a time, with the year said clearly. Give them to four children to stand in order; the class helps. Then place the "now" card at the end and lay the time-band cards above: all four dated cards are "long ago". (1835, 1837, 1840, 1841, now.)
3. **Two accounts** (8 min). Read Mouse's and Goat's accounts aloud. Say: "These are pretend accounts of the same pretend day." In pairs, children find one thing that is the same (stamps came; people pay when they send) and one thing that is different (Mouse is happy; Goat finds it a muddle, but likes one part).

✓ Discussion questions (5 min, with answers)

- "Why might Mouse and Goat tell it so differently?" (Mouse carries letters, so not collecting coins helps; Goat now pays first and cuts stamps.)
- "Is one of them lying?" (No: they had different jobs and saw different parts of the change. Two true accounts can still be different.)
- "If we had only Mouse's account, what might we think?" (That everyone was happy.) "So why is it good to read more than one source?" (To see more of what happened.)

✓ Closing check (5 min, with answers)

Each child tells or shows a partner one way Mouse's and Goat's accounts are different. (Mouse is happy; Goat finds it a muddle; Goat has to cut stamps; Mouse does not wait for coins.) Mark who gave a difference.

Then begin the one-to-one assessment in the README over the next week.

Vocabulary

timeline, order, before, after, account, the same, different, problem, change, mark

Differentiation

- Support: order only two cards (1840 and now), and find one difference with the adult pointing to Mouse's and Goat's faces.
- Extension: write a third account of the same day, from Hen, and say how it is different.
- Children can order the cards on a table rather than standing, and answer by pointing, signing, AAC or drawing.

⚠ Safety

- The accounts belong to Little Hill characters. Do not ask children to write about real people they know.
- Use pictures of the stamps; real old stamps are not needed.

Teacher notes and misconceptions

- Children may think that once a change is made, it is finished. The cancel mark story shows that people keep fixing new problems.
- Children may read "1840" and "1841" as very far apart. Point out they are next-door years.
- The accounts are made up, not real 1840 sources. A teacher with short real extracts from the time could use them instead.

Grade 2 Society: Places Near and Far: Weather, Land and a Parcel's Journey (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 11 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every activity against your school's rules.
>
> Text-checked by three other agents (Gemini 3.8 Flash, Gemini 4 Argon and Gemini 4 Carbon); see Known gaps.

Back to the grade 2 year plan - Term 3. Builds on grade 1: Maps, keys and globes and the society progression

Big idea

The weather and the land of a place shape how people live there: what they wear, how they build, and what work they do. No place has everything it needs, so people, goods and ideas move from place to place, near and far. A map with a key helps us follow how they travel.

This is the third society unit of grade 2 (term 3). It builds on the grade 1 unit Maps, keys and globes (looking down from above, symbols and a key, land and water on a globe) and on the grade 2 term 1 unit People, jobs and choices (goods and services). Grade 2 adds three different kinds of place, the link between land and work, needs met from near and from far, and one journey followed on a map.

All three places are made up: Little Hill (a small town by a river), Snowy Peak (a small village high on a mountain) and Big Harbour (a busy city by the sea). Using made-up places means no real town, country or group of people is described in a way that might be unfair to it. See Known gaps.

Outcomes

By the end of the unit most children can:

1. Describe the weather and the land of one of the three places and say one way they change how people live there (clothes, homes or work).
2. Match a job to a place and give a reason that uses the land or the water (for example, "fishing at Big Harbour, because it is by the sea").
3. Say whether something a character needs comes from near or far, and say one way two places meet their needs differently.
4. Use the key on the Little Hill map to name the symbols along a route and say what each one stands for.
5. Put the parcel's journey in order and say two ways it travelled.
6. Give one reason why goods, people or ideas move from place to place, and name one idea that moved in the unit.

Prior knowledge

- Grade 1 society term 3: maps are drawn as if looking down from above; symbols and a key; land and water on a globe.
- Kindergarten society: near, far, next to, in front of, behind.
- Grade 2 society term 1: goods and services; jobs in a community.
- Grade 2 science term 3: habitats; plants and animals live where their needs are met. Lesson 1 makes the same point for people.
- No reading is needed. Every card has a picture; words on cards are for the adult.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week.

1. What is it like there?: three place posters; weather and land cards; sorting clothes and home cards to the place they suit.
2. Land and work: job cards; matching each job to the place whose land or water it needs; "Could this job happen here?"
3. Near and far for what we need: needs cards for a character in each place; sorting "from near" and "from far"; comparing a village, a town and a city.
4. Following a parcel: Goat's scarf travels from Snowy Peak to Duck in Little Hill on a big floor map with a key; journey cards in order.
5. Goods, people and ideas on the move: why things move; a song travels in a letter; pairs draw a parcel route with their own key.

Materials (whole class unless noted)

- Three large place posters, drawn by the teacher from the descriptions in lesson 1: Little Hill, Snowy Peak, Big Harbour (all lessons).
- Four weather cards: sun, rain cloud, snowflake, wind (lesson 1).
- Twelve picture cards, from the list in lesson 1: six clothes cards and six home cards, one set per group of four (lesson 1).
- Nine job cards, from the list in lesson 2, one set per group of four (lesson 2), plus three extra cards for the whole class: a teacher, a baker, a doctor (lesson 2).
- A large "Could this job happen here?" chart (lesson 2).
- Nine needs cards, from the list in lesson 3, one set per group of four, and a "From near / From far" sorting mat per group (lesson 3).
- The Little Hill floor map, about 2 m by 1.5 m on joined paper or an old sheet, drawn by the teacher from the description in lesson 4, with a key of eight symbols (lessons 4, 5).
- A small closed box as the parcel, with a paper scarf drawn on the label (lessons 4, 5).
- Six journey cards, from the text in lesson 4, one set per group of four (lesson 4).
- Goat's letter, from the text in lesson 5, read aloud by an adult (lesson 5).
- An A4 sheet with three places drawn in the corners (Big Harbour, Little Hill, Snowy Peak), one per pair, and crayons (lesson 5).
- Sticky notes or paper slips and pencils (lessons 2, 3, 5).
- A globe or world map, if the class has one (optional; lesson 1).
- For blind or low-vision children: raised-line versions of the place posters, weather cards and map symbols (glue string or puffy paint on the outline), a piece of knitted fabric or a knitted glove, a smooth stone and a small cloth bag of dry sand to feel, a sorting mat with a raised

line down the middle (lesson 3), and string with glue sticks to make a raised route on a raised-outline A4 sheet (lesson 5) (all lessons unless noted).

⚠ Safety and access

- **Privacy.** Never ask where children or their families live, where they were born, where their relatives are, where they go on holiday, where their family shops, or where their clothes or food come from. Every place, home and parcel in this unit belongs to a made-up character. Children may share something about places they know only if they choose to; do not write it down.
- **Fairness to real places.** Do not ask children to describe real countries or peoples by their clothes, homes or food. If a child does, say: "People in any place live in lots of different ways."
- **Fabric to touch.** Check for wool allergies before passing round knitted fabric; use a cotton or acrylic knit if unsure.
- **Sand bag.** The sand stays inside a closed, tied cloth bag. Check your school's rules on sand with the age group.
- Moving the parcel on the floor map in lesson 4 is walking or kneeling; a child can stay seated and tell a partner where to move it, or point with a pointer from a chair. Leave a clear path round the map for wheelchairs.
- Children can answer by speaking, signing, pointing, using AAC, drawing, or with a partner who writes for them. Their own way counts.
- Deaf children: show every card and poster while it is described, and face the class when reading aloud. Blind and low-vision children: use the raised-line posters and symbols and the objects listed in Materials; describe each picture in words. Colour is never the only clue (each map symbol has a different shape).

Assessment

Watch and listen during lessons, and use the closing checks. During lesson 5 or the following week, see each child for about 3 minutes with the posters, cards and floor map (answers in brackets):

1. Point to one poster: "What is the weather like here? What is the land like?" "How does that change how people live?" (Snowy Peak: cold, snowy in winter, steep and high; warm coats, thick walls, sheep on the slopes. Little Hill: often rainy, green valley by a river; raincoats, apple trees, farms. Big Harbour: windy, flat, by the sea; boats, a port, fishing. Any sensible link counts.) (Outcome 1.)
2. Show the fishing-boat card and the sheep card: "Which place does each job belong to? Why?" (Fishing at Big Harbour, because it is by the sea; keeping sheep at Snowy Peak, because of the grassy slopes.) (Outcome 2.)
3. "Goat lives at Snowy Peak. Goat's cheese comes from Goat's own goats. Is that from near or from far?" (Near.) "Goat's apples come from Little Hill. Near or far?" (Far.) "Tell me one way Big Harbour gets food differently from Snowy Peak." (For example, fish from the sea next to it, or lots of things come in on ships.) (Outcome 3.)
4. On the floor map, trace the route from the mountain road to the post office: "What do these symbols stand for?" (Road, bridge, river, railway, station, post office: any three named from the key.) (Outcome 4.)

5. Give the six journey cards: "Put the scarf's journey in order." "How did it travel?" (Knitting, wrapping, mail van down the mountain, train, post office, Duck; any two of van, train, walking.) (Outcome 5.)
6. "Why did the scarf have to travel?" (Duck needed it and it was made far away; Little Hill has no sheep, or similar.) "What idea travelled?" (The Little Hill Market song, in Goat's letter.) (Outcome 6.)

Record "yes", "with help" or "not yet" for each outcome. A child who can do it in their own way (pointing, signing, AAC) gets "yes".

Sources

The C3 framework was read in the archived PDF (pages with the K-2 geography indicators): https://web.archive.org/web/20220403055307/https://www.socialstudies.org/sites/default/files/2017/Jun/c3-framework-for-social-studies-rev0617.pdf

The indicators used, quoted from the framework:

- D2.Geo.2.K-2: "Use maps, graphs, photographs, and other representations to describe places and the relationships and interactions that shape them." (Lessons 1, 4.)
- D2.Geo.3.K-2: "Use maps, globes, and other simple geographic models to identify cultural and environmental characteristics of places." (Lessons 1, 4.)
- D2.Geo.4.K-2: "Explain how weather, climate, and other environmental characteristics affect people's lives in a place or region." (Lesson 1.)
- D2.Geo.6.K-2: "Identify some cultural and environmental characteristics of specific places." (Lesson 1.)
- D2.Geo.7.K-2: "Explain why and how people, goods, and ideas move from place to place." (Lessons 4, 5.)
- D2.Geo.8.K-2: "Compare how people in different types of communities use local and distant environments to meet their daily needs." (Lesson 3.)
- D2.Geo.9.K-2: "Describe the connections between the physical environment of a place and the economic activities found there." (Lesson 2.)

Two facts come from Wikipedia articles, read on 11 November 2026:

- "Mountain": https://en.wikipedia.org/wiki/Mountain ("High elevations on mountains produce colder climates than at sea level at similar latitude.") Used for Snowy Peak being colder than the towns below.
- "Wool": https://en.wikipedia.org/wiki/Wool ("Most wool used by the textile industry comes from sheep.") Used for Goat's scarf.

Little Hill, Snowy Peak, Big Harbour, their characters, the cards, the map, the parcel's journey and Goat's letter are the author's own examples, not from a source.

Known gaps and cautions

- Three other agents text-checked this unit on 2026-11-11: Gemini 3.8 Flash (at 0e4e47d) and Gemini 4 Carbon (at 7ab413a) reported no errors; Gemini 4 Argon (at 0e4e47d) found that the materials list left out lesson 2's three whole-class job cards, now added. Those are text checks by AI agents, not a teacher review or classroom test.
- The three places are made up. D2.Geo.6 asks about "specific places" and D2.Geo.10 (not covered) asks about "various world regions". A teacher may add one real place, with a

source such as a library book, photographs or a map, after this unit; keep the fairness point in Safety and access.

- The unit does not teach climate zones, the equator or real distances. The only climate fact used is that high mountains are usually colder than land below them.
- The clothes, homes and jobs on the cards are the author's examples of what might suit each place, not rules. People in a cold place can wear thin clothes indoors, and a city by the sea has many jobs that are not fishing. Children who give a good reason for a different answer are right.
- D2.Geo.5 (how human activities change places) and D2.Geo.1 (constructing maps) are only touched on: children draw a simple route map in lesson 5.
- The parcel's route (van, then train) is one made-up example. Real parcels travel in many ways.
- Wikipedia is a starting point, not a final authority.

Lesson 1: What is it like there?

Unit overview - Next: Land and work

Back to the grade 2 year plan

Goal

Children describe the weather and the land of three made-up places, and sort clothes and homes to the place they suit, giving a reason that uses the weather or the land.

Materials

- The three place posters, drawn by the teacher before the lesson:
  - **Little Hill:** a small town in a green valley. A river runs through it, with a bridge. Rain clouds in the sky. Fields, apple trees and a market.
  - **Snowy Peak:** a small village high on a mountain. Snow on the tops. Steep grassy slopes with sheep and goats. A few houses with smoke from the chimneys.
  - **Big Harbour:** a busy city on flat land by the sea. A port with big ships and small fishing boats. Tall buildings, lots of people, flags blowing in the wind, seagulls.
- Four weather cards: sun, rain cloud, snowflake, wind.
- Twelve picture cards per group of four (the answers in brackets are the author's; other answers with a good reason count):
  - Clothes: a woolly hat and gloves (Snowy Peak); a thick padded coat (Snowy Peak); a raincoat (Little Hill); wellington boots (Little Hill); a windproof jacket zipped to the chin (Big Harbour); a sun hat (Big Harbour, on a sunny summer day by the sea).
  - Homes: a house with thick stone walls and a big stove (Snowy Peak); a house with snow piled on its roof (Snowy Peak); a house with a water butt catching rain from the roof (Little Hill); a cottage by the river with an apple tree (Little Hill); a tall block of flats near the port (Big Harbour); a house with strong shutters closed against the wind (Big Harbour).
- A globe or world map (optional).
- For blind or low-vision children: raised-line posters and weather cards, a piece of knitted fabric, a smooth stone and a closed bag of sand to feel.

Steps

✎ Opening (5 min)

1. Show the three posters one at a time. For each, ask: "What can you see? What is the weather like? What is the land like: flat, steep, wet, dry?"
2. Children hold up or point to a weather card for each poster. Accept more than one card: Big Harbour can be windy and sunny.
3. Say: "A place's weather and land are part of what makes it different from other places."

✎ Main activity (25 min)

1. Groups of four get the twelve picture cards and lay the three posters (or small copies) in front of them.
2. **Clothes (10 min).** Groups put each clothes card next to the place where it would help most. For each card, one child says why: "The woolly hat goes to Snowy Peak because it is cold up the mountain."
3. **Homes (10 min).** Groups do the same with the home cards. Ask: "Why would a house at Snowy Peak need thick walls and a big stove?" (To keep warm, because it is cold up high.) "Why catch rain in a water butt at Little Hill?" (It rains a lot; the water can be used in the garden.)
4. **Share (5 min).** Each group shows one card they argued about. Any choice with a reason that uses the weather or the land counts.

✓ Discussion questions (5 min, with answers)

- "Why is Snowy Peak colder than Little Hill?" (It is high up a mountain; high places are usually colder than the land below them.)
- "Could someone at Big Harbour wear a woolly hat?" (Yes, on a cold day. The cards show what might help most, not what everyone wears.)
- "What would change for Duck if Little Hill had no rain all summer?" (Any sensible answer: the river gets low, the apple trees need watering.)

✓ Closing check (5 min, with answers)

Ask each child one question; they answer by pointing, speaking or signing.

1. "Point to the place with snow on the mountain." (Snowy Peak.)
2. "Which place is by the sea?" (Big Harbour.)
3. "Where would wellington boots help most? Why?" (Little Hill, because it rains a lot; or another place with a good reason.)

Vocabulary

weather, land, valley, mountain, steep, flat, port, village, town, city

Differentiation

- **More support:** sort only the clothes cards, with two posters.
- **More challenge:** invent one more card (a coat, a roof, a tool) for a place and explain why it suits the weather or land.
- Children who cannot see the posters use the raised-line versions and feel the knitted fabric (Snowy Peak), the smooth stone (river at Little Hill) and the bag of sand (beach at Big Harbour).

⚠ Safety

- Check for wool allergies before passing round the knitted fabric.
- The sand stays inside the closed bag.
- Do not ask children what clothes they own or what their own home is like.

Teacher notes and misconceptions

- Children may think everyone in a place dresses the same. Say: "People in any place live in lots of different ways. These cards show what might help with the weather."
- Some children may say Big Harbour is hot because it is by the sea. Places by the sea can be hot or cold; Big Harbour is made up, and the poster shows wind, not heat.
- If you have a globe, you can show that real mountains are high places, and that high places are usually colder than the land below (from the Wikipedia article "Mountain"; see the unit Sources).

Lesson 2: Land and work

Unit overview - Previous: What is it like there? - Next: Near and far for what we need

Back to the grade 2 year plan

Goal

Children match jobs to the place whose land or water they need, and give a reason that links the job to the land or the water.

Materials

- The three place posters from lesson 1.
- Nine job cards per group of four (the answers in brackets are the author's):
  - Keeping sheep on the slopes (Snowy Peak).
  - Making cheese from goats' milk (Snowy Peak).
  - Knitting with wool (Snowy Peak).
  - Growing apples (Little Hill).
  - Growing wheat in the fields (Little Hill).
  - A miller whose mill wheel is turned by the river (Little Hill).
  - Fishing from a boat (Big Harbour).
  - Unloading ships at the port (Big Harbour).
  - A lifeboat crew that helps boats in trouble at sea (Big Harbour).
- Three extra cards for the whole class: a teacher, a baker, a doctor.
- A large "Could this job happen here?" chart with three columns (Little Hill, Snowy Peak, Big Harbour).
- Sticky notes or paper slips and pencils.
- For blind or low-vision children: raised-line posters; job cards described aloud.

Steps

✎ Opening (5 min)

1. Recall lesson 1: "What is the land like at Snowy Peak? At Big Harbour?"
2. Show the fishing card. "Could this job happen at Snowy Peak?" (No: there is no sea.) "Where could it happen?" (Big Harbour.)
3. Say: "Some jobs need the land or the water of a place."

✎ Main activity (25 min)

1. Groups sort the nine job cards to the three posters (10 min). For each card one child says the link: "Keeping sheep at Snowy Peak, because there are grassy slopes for them to eat."
2. **Could this job happen here? (10 min).** The teacher reads out three jobs, one at a time, and pins each onto the chart: fishing, growing apples, keeping sheep. For each place, the class shows thumbs up (yes), thumbs down (no) or a flat hand (not sure). A

child gives the reason. Example: "Fishing at Little Hill? Maybe a little, in the river, but not big boats."

3. **Jobs that can happen anywhere (5 min).** Show the teacher, baker and doctor cards. "Do these jobs need a sea, a mountain or a river?" (No: people everywhere need teachers, bread and doctors.) Children draw or write one more job that can happen anywhere on a sticky note.

✓ Discussion questions (5 min, with answers)

- "Why does the miller's mill sit by the river?" (The river turns the mill wheel.)
- "Big Harbour has lots of jobs at the port. Why?" (Ships come into the port, and someone has to unload them; the port is there because the city is by the sea.)
- "If you moved the sheep to Big Harbour, what would they need?" (Grass and space to eat; the city has tall buildings and not much grass.)

✓ Closing check (5 min, with answers)

1. "Which place needs a lifeboat crew? Why?" (Big Harbour; it is by the sea.)
2. "Point to the job that uses the river." (The miller.)
3. "Tell me one job that can happen anywhere." (Teacher, baker, doctor, or another sensible job.)

Vocabulary

job, land, water, slope, port, mill, crew

Differentiation

- **More support:** sort three cards, one per place, with a partner.
- **More challenge:** choose a job and say what would happen to it if the weather changed (for example, a very dry summer for the apple grower).
- Children can sort by pointing, eye-gaze or telling a partner where to put each card.

⚠ Safety

- Do not ask what jobs children's parents or carers do. All jobs belong to made-up characters.

Teacher notes and misconceptions

- Children may think a city by the sea has only fishing jobs. Most jobs in a city do not need the sea; this lesson picks the ones that do.
- The links between job and place are the author's examples. A child who says "you could knit at Big Harbour too" is right: the wool can travel. That idea leads into lesson 3.

Lesson 3: Near and far for what we need

Unit overview - Previous: Land and work - Next: Following a parcel

Back to the grade 2 year plan

Goal

Children sort things that three characters need into "from near" and "from far", and compare how a village, a town and a city meet their needs.

Materials

- The three place posters from lesson 1.
- Nine needs cards per group of four. Each card shows a character, a thing they need and where it comes from (the answers in brackets are the author's):
  - **Goat at Snowy Peak (a village):** cheese from Goat's own goats (near); wool from the sheep on the slopes (near); apples from Little Hill (far).
  - **Duck at Little Hill (a town):** apples from the orchard by the river (near); bread from the Little Hill bakery, made with flour from the fields (near); fish from Big Harbour (far).
  - **Crab at Big Harbour (a city):** fish from the sea next to the city (near); bread made with flour that comes by train from farms far away (far); bananas brought by ship from far away (far).
- A "From near / From far" sorting mat per group: a sheet with two halves, "near" with a picture of a house and "far" with a picture of a road going into the distance.
- Sticky notes or paper slips and pencils.
- For blind or low-vision children: the needs cards read aloud, and a sorting mat with a raised line down the middle and a different texture on each half.

Steps

✎ Opening (5 min)

1. Recall the word **needs** from science (habitats): plants and animals live where their needs are met. "People have needs too: food, water, warm clothes, a home."
2. "Can every place make everything it needs?" Show the Snowy Peak poster. "Can apples grow at Snowy Peak?" (Goat says no: it is too cold up there.)
3. Say: "Some things come from near. Some things have to come from far."

✎ Main activity (25 min)

1. Groups take Goat's three cards and sort them onto the mat (5 min). Check together: two near, one far.
2. Groups sort Duck's three cards, then Crab's three cards (10 min).
3. **Count and compare (10 min).** On the board, draw a table with the three characters and two columns, near and far. Groups say how many of each character's cards are

near and far. (Goat: 2 near, 1 far. Duck: 2 near, 1 far. Crab: 1 near, 2 far.) Ask: "On our cards, who gets more things from far away?" (Crab, in the city.) "Why might that be?" (A city has lots of people and not many fields; ships and trains bring things in.)

✓ Discussion questions (5 min, with answers)

- "Goat gets cheese from near. Crab gets fish from near. Why are they different things?" (Each place has different land and water: goats on the mountain, fish in the sea.)
- "What would happen to Crab's bread if the trains stopped?" (Less flour would come; the city bakers would run short.)
- "Is 'far' the same for everyone?" (No. Little Hill is far for Goat but near for Duck.)

✓ Closing check (5 min, with answers)

1. "Goat's wool comes from the sheep on the slopes. Near or far?" (Near.)
2. "Crab's bananas come by ship. Near or far?" (Far.)
3. "Tell me one way Big Harbour gets food differently from Snowy Peak." (For example, Big Harbour gets fish from the sea; Snowy Peak gets cheese from its goats; or more things come to the city by ship and train.)

Vocabulary

need, near, far, village, town, city, local, distant

Differentiation

- **More support:** sort Goat's cards only, with an adult.
- **More challenge:** make a tenth card for one character: something they need, and whether it comes from near or far.
- Children can sort by pointing or telling a partner which half to use.

⚠ Safety

- **Privacy.** Do not ask where children's food, clothes or belongings come from, or where their family shops. All needs belong to made-up characters.

Teacher notes and misconceptions

- The counts in step 3 are from the author's nine cards, not a rule about real cities and villages. Many villages get lots of things from far away, too.
- Children may think "far" means another country. Here it means "not in this place"; Little Hill is a train ride from Snowy Peak.
- "Local" and "distant" are the words used in the C3 framework (D2.Geo.8); "near" and "far" are enough for most children.

Lesson 4: Following a parcel

Unit overview - Previous: Near and far for what we need - Next: Goods, people and ideas on the move

Back to the grade 2 year plan

Goal

Children follow a parcel's journey on a floor map, name the map symbols along the route using the key, and put the journey in order.

Materials

- The Little Hill floor map, drawn by the teacher before the lesson on joined paper or an old sheet, about 2 m by 1.5 m:
  - Snowy Peak at the top left, on a mountain, with Goat's house and a post box.
  - A road winding down the mountain to a station at the foot of the mountain.
  - A railway running from that station, across a bridge over the river, to Little Hill station at the bottom right.
  - Little Hill post office next to Little Hill station, and Duck's house a short way along a road.
  - A key in one corner with eight symbols, each a different shape: mountain (a triangle), road (two lines side by side), railway (a line with short cross lines), river (a wavy line), bridge (two short lines across the river), station (a rectangle with a flag), post office (an envelope), house (a square with a triangle roof).
- A small closed box as the parcel, with a paper scarf drawn on the label.
- Six journey cards per group of four:
  1. Goat knits a scarf with wool from the sheep.
  2. Goat wraps the scarf and posts it in the Snowy Peak post box.
  3. The mail van drives the parcel down the mountain road to the station.
  4. The train carries it over the river bridge to Little Hill.
  5. The parcel is sorted at Little Hill post office.
  6. Mouse walks it to Duck's house, and Duck opens it.
- For blind or low-vision children: map symbols and the route made in raised lines (glue string or puffy paint), and a real small box to hold.

Steps

✎ Opening (5 min)

1. Gather round the floor map. "Is this map drawn from the side or from above?" (From above; recall grade 1.)
2. Point to the key. "What is this for?" (It tells us what each symbol means.) Children match three symbols on the map to the key.
3. Show the parcel. "Duck is cold. Goat has knitted a scarf at Snowy Peak. How will it get to Duck?"

✎ Main activity (25 min)

1. **Move the parcel (15 min).** Children take turns to move the parcel one step along the route. At each step the child names the symbol it reaches, using the key ("This is the road", "This is the bridge over the river"), and says how the parcel travels (in Goat's hands, in the van, on the train, with Mouse). Every child has at least one turn; a child can tell a partner where to move it.
2. **Journey cards (10 min).** Back at tables, groups put the six journey cards in order. An adult reads each card aloud. Groups check their order by retelling the journey to another group.

✓ Discussion questions (5 min, with answers)

- "Why did the parcel need a van and a train?" (Snowy Peak is far from Little Hill, high up a mountain, across a river.)
- "Why does the railway need a bridge?" (To cross the river.)
- "Who helped the parcel on its way?" (Goat, the van driver, the train driver, the post office sorters, Mouse.)

✓ Closing check (5 min, with answers)

1. Point to the bridge symbol on the key: "What does this stand for?" (A bridge.)
2. "What happened just after the train?" (The parcel was sorted at Little Hill post office.)
3. "Tell me two ways the parcel travelled." (Any two of: van, train, carried or walked.)

Vocabulary

parcel, route, journey, key, symbol, station, railway, bridge

Differentiation

- **More support:** use four journey cards (1, 3, 4, 6).
- **More challenge:** find a different route on the map (for example, could the van drive all the way?) and say whether it is shorter or longer.
- Children who cannot see the map follow the raised-line route with a finger while an adult names each symbol.

⚠ Safety

- Children walk or kneel round the floor map; nobody runs or stands on it. Leave a clear path for wheelchairs and let seated children point or direct a partner.
- Do not ask whether children have sent or received parcels, or where relatives live.

Teacher notes and misconceptions

- Children may think the parcel moves by itself. Ask "Who carried it here?" at each step.

- The van-then-train route is one made-up example. Real parcels travel in many ways, sometimes by ship or plane.
- Keep the map simple: eight symbols are enough for grade 2.

Lesson 5: Goods, people and ideas on the move

Unit overview - Previous: Following a parcel

Back to the grade 2 year plan

Goal

Children give reasons why goods, people and ideas move from place to place, and draw a simple route map with a key.

Materials

- The three place posters and the floor map from lesson 4.
- Goat's letter, read aloud by an adult:

  Dear Duck,

  I hope the scarf keeps you warm. Thank you for the song you sent, "Little Hill Market". The Snowy Peak children sing it every morning now.

  Could you send some apples? Apples do not grow up here; it is too cold.

  In the spring I will come down the mountain on the train to visit you.

  From Goat

- An A4 sheet per pair with three places drawn in the corners: Big Harbour (bottom left), Little Hill (bottom right), Snowy Peak (top).
- Crayons, and sticky notes or paper slips and pencils.
- For blind or low-vision children: an A4 sheet with the three places in raised outlines, and string and glue sticks to make a raised route.

Steps

✎ Opening (5 min)

1. Read Goat's letter aloud. Ask: "What is moving in this letter?"
2. Sort the answers into three groups on the board: **goods** (the scarf, the apples), **people** (Goat, coming to visit), **ideas** (the song).
3. If the class learned "Little Hill Market" in grade 2 arts, sing one verse. "The song moved from Little Hill to Snowy Peak. Did the song travel in a van?" (It travelled in a letter; ideas can travel in letters, stories, calls and on screens.)

✎ Main activity (25 min)

1. **Why do things move? (5 min).** For each item in Goat's letter, ask why it moves. (Apples: they cannot grow at Snowy Peak. Scarf: Duck needed it and Goat could make it. Goat: to visit a friend. Song: the children liked it.) Write or draw one reason next to each.
2. **Draw a route (15 min).** Pairs plan a parcel from Big Harbour to Snowy Peak: a book about the sea for the Snowy Peak school. On their A4 sheet they draw a route with at least three symbols (for example road, railway, river, bridge) and a key in the corner showing what each symbol means.
3. **Swap and read (5 min).** Pairs swap sheets with another pair and use the key to tell the journey back: "The book goes on the road, then over the bridge, then on the train..."

✓ Discussion questions (5 min, with answers)

- "Why might people move to another place?" (Any sensible reason: to visit, to find work, to be near family, to go to school. Do not ask about children's own families.)
- "Which moved fastest in our unit: the scarf, Goat or the song?" (Any answer with a reason; for example, a song sent by a call or a screen can arrive at once.)
- "Was your key useful to the other pair? What would make it clearer?" (Each symbol a different shape; a label next to each.)

✓ Closing check (5 min, with answers)

1. "Tell me one thing in Goat's letter that is goods." (The scarf or the apples.)
2. "Why do the apples have to travel to Snowy Peak?" (Apples do not grow there; it is too cold.)
3. "What idea travelled in the unit?" (The song "Little Hill Market".)

Vocabulary

goods, people, ideas, move, route, key, symbol

Differentiation

- **More support:** draw the route with two symbols and an adult writing the key.
- **More challenge:** add a second route for a different parcel and a different colour and shape for it in the key.
- Children who cannot draw use the raised outline sheet and stick string for the route; an adult writes the key from what they say.

⚠ Safety

- Do not ask children whether they or their families have moved, where they came from, or who they would visit. All journeys belong to made-up characters.

- Glue sticks only; no hot glue.

Teacher notes and misconceptions

- Children may think only objects can move. Goat's letter shows that people and ideas move too.
- Children may think ideas need a person to travel with them. The song went in a letter; ideas also travel by phone, on screens and in books.
- Use this lesson or the following week for the one-to-one assessment in the unit overview.

Maps, routes, and places

Subject: History, geography and society Grade: 3 Lessons: 5 Time per lesson: about 50–55 minutes

Status: written (unreviewed AI draft; not human-educator-reviewed or classroom-tested)

Author: GPT-5.6 Sol

Big idea

A map is a purpose-built model of a place. Symbols, a legend, direction, a grid and scale help people communicate about that place, but every map leaves details out and a suitable route depends on a traveller's needs.

What students should be able to do

- Explain how a map differs from the place it represents and how purpose affects what a map includes.
- Interpret and create point, line and area symbols with a clear legend that does not depend on colour alone.
- Use a north arrow, cardinal directions and letter-first alphanumeric grid references.
- Find whole-number route lengths on a square grid when one edge represents 100 metres.
- Compare routes using distance and stated constraints rather than calling one route best for everyone.
- Create, test and revise a map for a stated fictional audience.

What students should already know

Students should be able to count by 100 to at least 1,000, follow a short sequence of instructions, and distinguish a real object from a drawing of it. The lessons teach rather than assume map vocabulary.

Use this oral diagnostic without treating it as an entry test:

1. If a tree is not drawn on a park map, must the park have no trees?
2. What could a key or legend tell a map reader?
3. If a path is 4 equal map edges long and each edge represents 100 m, how long is it?

Diagnostic guide: (1) No; the map may omit it. (2) What symbols mean. (3) 400 m. Revisit any uncertain answer during the unit.

Lesson list

1. A map is a model: compare two maps of the same fictional park and connect selection to purpose.
2. Symbols and legends: read, classify and repair point, line and area symbols.
3. Direction and grid references: use a north arrow, cardinal directions and letter-first grid cells.

4. Scale and choosing a route: count route segments and compare distance with stated access needs.
5. Make, test, revise: design a fictional map, test it with a reader, revise it and complete an eight-task assessment.

Materials (whole unit)

Printed or digital lesson maps and cards, paper, pencils, counters or sticky notes, ruler or straight edge, and optional string or craft sticks for tracing routes. All maps have plain-text descriptions. Provide large print, raised/tactile lines, pre-cut symbol cards or oral directions where helpful. No live internet, account, purchase, personal location, image file or field trip is required.

Assessment

Lesson 5 contains an original fictional map packet with exactly eight numbered tasks and a full worked guide. Students may answer orally, with movable symbols, by typing or by drawing. Assess the geographical ideas rather than handwriting, drawing precision, speed, accent or colour vision. There is no validated pass threshold, and the task does not measure every map skill.

Sources

Consulted November 4, 2026:

- USGS Topographic Map Symbols informed the general treatment of conventional symbols and legends.
- USGS Map Scales informed the explanation that scale relates distance on a map to distance on the ground.

These are background influences, not claims of official alignment or endorsement. All fictional maps, place names, questions and explanations in this unit are original CC0 material. Linked sources remain under their own terms.

Known gaps and cautions

Pacing, reading load, accessibility and cultural context are untested. A qualified local educator should review the unit before classroom use. A north-at-page-top layout is a convention used only when the north arrow says so; it is not a natural rule.

The simplified square-grid scale does not teach curved-route measurement, contour lines, map projections, latitude and longitude, GIS or contested boundaries. Maps reflect choices, can become outdated and can contain mistakes. Teachers should not replace fictional activities with children's home addresses, personal travel patterns or unsupervised outdoor route tasks.

Lesson 1: A map is a model

Time: about 52 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: GPT-5.6 Sol.

Goal

Explain that a map represents selected features of a place for a purpose and that an omitted feature is not necessarily absent.

Materials

Willow Park cards below, paper, two highlighters or two tactile markers, and optional blocks or classroom objects to view from above.

Steps

✎ 1. Opening — 6 minutes

Place three objects on a desk. Ask students to sketch what they see from the side and then from directly above. Discuss why an overhead view can make positions easier to compare while hiding other details.

2. Place and model — 8 minutes

Define a **place** as a location with features and a **map** as a purpose-built model of all or part of a place. A model is not a tiny copy: it selects, simplifies and labels. Ask what a classroom fire-exit map needs and what a classroom furniture-moving plan needs. **Example response:** Both need doors and walls; the moving plan also needs furniture sizes, while the exit map needs a clear safe route.

3. Compare two Willow Park maps — 15 minutes

Both cards describe the same fictional park.

Map A: visitor map

```
               N ↑
 [Pond] ---- [Bridge] ---- [Picnic tables]
    |                          |
 [Main gate] ------------ [Play area]
Legend: ---- walking path; [ ] named place
```

Text equivalent: The pond is north of the main gate. A path runs east from the pond across a bridge to picnic tables. Another path runs east from the main gate to the play area. A north-south path connects the pond and gate; another connects the picnic tables and play area.

Map B: grounds-work map

```
               N ↑
 (Tap) ===== (Drain) ===== (Tool shed)
    |                          |
 (Gate) ================== (Sand bin)
Legend: ===== service pipe; ( ) work location
```

Text equivalent: A tap is north of the gate; a drain is east of the tap; the tool shed is east of the drain; and the sand bin is south of the tool shed. Service pipes connect the shown work locations.

Students list two facts each map supports and two questions it cannot answer. Explain that the aligned layouts indicate the same general place, but the cards select different features for visitors and grounds workers.

4. Purpose cards — 12 minutes

For each fictional audience, students choose useful features and justify one omission:

- a visitor finding a picnic table;
- a worker checking a water pipe;
- a performer moving equipment to the play area.

Example: The performer needs wide paths, gates and the play area. Pond depth is probably not needed for that purpose. Not drawing the depth does not claim the pond has no depth.

5. Evidence or inference — 6 minutes

Ask:

1. Does Map A support “A walking path connects the gate and play area”? **Yes.**
2. Does Map A prove “The park has no tool shed”? **No; it may be omitted.**
3. Does Map B prove visitors may walk along the service pipe? **No; a pipe symbol is not a walking-path symbol.**

✓ 6. Closing check — 5 minutes

1. Complete: “A map is not the place; it is ___.” **Answer:** a model or representation of selected features.
2. Why might two accurate maps of one place look different? **Answer:** They may serve different purposes or audiences and select different details.

Vocabulary

- **Place:** a location with features.
- **Map:** a purpose-built model of all or part of a place.
- **Feature:** something at a place that can be represented.
- **Omit:** leave out.
- **Purpose:** what something is intended to help a person do.

Differentiation

- **Extra support:** let students match physical objects to overhead symbol cards; read cards aloud and use tactile lines.

- **Extra challenge:** name one feature that could mislead a reader if omitted from an emergency map and explain why.

⚠ Safety

Use only the fictional park. Do not ask students to map home addresses, habitual routes or private locations.

Teacher notes

Avoid saying a map is simply “a picture from above.” Some maps show networks, underground systems or data that no eye sees directly. Accuracy is connected to purpose, date and scale; a truthful map can still be unsuitable for a different task.

Unit overview · Next lesson

Lesson 2: Symbols and legends

Time: about 54 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: GPT-5.6 Sol.

Goal

Interpret and create point, line and area symbols, using a legend that works without colour.

Materials

Symbol cards below, paper, string, counters, optional pre-cut shapes and tactile materials.

Steps

✎ 1. Opening — 6 minutes

Show a dot, a line and a shaded rectangle. Ask what each could mean. Accept several answers, then ask what information is missing. **Example:** A legend is missing, so the same dot might mean a tree, tap or bus stop.

2. Three useful symbol types — 10 minutes

- A **point symbol** represents a location, such as a fountain.
- A **line symbol** represents a path, stream or boundary.
- An **area symbol** represents a region, such as a field.

The category describes how the feature is represented at this map's scale. A large real pond can be an area, while a pond on a very small map might be a point.

3. Decode Juniper Square — 16 minutes



Text equivalent: The meadow occupies the northwest area. A tree is north of a fountain. A path runs from the fountain northeast to a junction, then east to a gate and south. The pond occupies the southwest area. The library garden occupies the southeast area.

Students answer:

1. Which symbols are points? **F, T and G.**

2. Which feature is crossed by the diagonal path? **The open space between the fountain and junction; the diagram does not show it crossing the pond.**
3. Is the tree inside the meadow? **No; it is drawn east of the meadow.**
4. Can we infer that every tree is shown? **No.**

4. Repair a broken legend — 12 minutes

Broken map notes say: “○ = fountain; ○ = gate; green = safe route.” Students identify two problems and repair them.

Example repair: Use `F` inside a circle for fountain and `G` inside a square for gate. Use a solid line for the ordinary route and a double line for the step-free route, with labels. The original reused one symbol for two meanings and depended on colour vision.

5. Design for a purpose — 5 minutes

Students create one point, one line and one area symbol for a fictional animal-care park. Partners decode them using only the legend. Drawing beauty is irrelevant; distinctness and explanation matter.

✓ 6. Closing check — 5 minutes

1. A border around a playground is what symbol type? **Line.**
2. Why should a map not rely only on red and green? **Some readers cannot distinguish them, and grayscale copies remove the difference. Use shape, pattern or labels too.**

Vocabulary

- **Symbol:** a mark that represents something.
- **Legend/key:** an explanation of map symbols.
- **Point:** a symbol locating a feature.
- **Line:** a symbol representing a route, flow or boundary.
- **Area:** a symbol representing a region.

Differentiation

- **Extra support:** provide pre-cut points, string lines and textured area cards; allow spoken classification.
- **Extra challenge:** explain how the same real feature could be a point on one map and an area on another.

⚠ Safety

Do not use student addresses or private places as symbol examples. Scissors or raised-line tools, if used, require ordinary classroom supervision.

Teacher notes

A point symbol locates rather than reproduces a feature's exact shape. A line may have width on the page without claiming a path has that exact ground width. A boundary symbol may describe an administrative choice rather than a visible wall.

Previous lesson · Unit overview · Next lesson

Lesson 3: Direction and grid references

Time: about 54 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: GPT-5.6 Sol.

Goal

Use a north arrow and cardinal directions, then locate cells with letter-first alphanumeric grid references.

Materials

Harbour Garden grid below, counters, paper, optional raised grid and movable labels.

Steps

✎ 1. Opening — 6 minutes

Rotate a sheet with an arrow on it. Ask whether the top of the page must always be north. **Answer:** No. Page-top means north only when the map's north arrow or convention says so.

2. Cardinal directions — 9 minutes

On today's map, north points to page-top, east right, south bottom and west left. Contrast:

- **movement:** “Move east one cell”;
- **relative position:** “The pond is east of the gate.”

A north arrow controls how page directions are interpreted; it does not move when a reader turns their body.

3. Read the grid — 15 minutes

Rows use letters A–D from north to south. Columns use numbers 1–4 from west to east. Give the **letter first**, so `B3` means row B, column 3. A reference identifies a whole cell, not an exact point inside it.

```
            N ↑
          1   2   3   4
      A | T | . | P | . |
      B | . | G | . | F |
      C | R | . | H | . |
      D | . | S | . | L |
Legend: T tree; P pond; G gate; F fountain;
        R rock garden; H shelter; S stage; L library kiosk; . empty shown cell
```

Text equivalent: A1 tree, A3 pond, B2 gate, B4 fountain, C1 rock garden, C3 shelter, D2 stage and D4 library kiosk. Other cells are shown empty.

Ask:

1. What is at C3? **Shelter.**
2. Where is the fountain? **B4.**
3. Which feature is east of the gate in the same row? **Fountain.**
4. Is the stage directly south of the gate? **Yes, at D2, with C2 between them.**
5. Does B2 tell the gate's exact location within that cell? **No.**

4. Follow and write directions — 13 minutes

Starting at the gate B2, make only north/east/south/west moves between adjacent cells; no diagonals.

- Move north one, east one. **End: A3, pond.**
- Move south two. **End: D2, stage.**
- Write a route from rock garden C1 to shelter C3. **Example:** east two cells. Other routes may work if stated.

Students swap one two- or three-move instruction and test it with a counter.

5. Find the error — 6 minutes

A guide says: “The fountain is at 4B, west of the gate.” Students repair both errors. **Answer:** The agreed convention is letter first, so B4; the fountain is east of the gate.

✓ 6. Closing check — 5 minutes

1. What tells a reader which page direction is north? **The north arrow.**
2. What does D4 identify? **The whole cell containing the library kiosk, not an exact point.**

Vocabulary

- **Cardinal directions:** north, east, south and west.
- **North arrow:** a symbol showing north on that map.
- **Grid:** crossing rows and columns used to organize locations.
- **Grid reference:** a label naming a grid cell.
- **Adjacent:** sharing an edge here, not only a corner.

Differentiation

- **Extra support:** use a raised 4×4 grid and counters; chant “letter row, number column”; allow oral moves.
- **Extra challenge:** rotate a copy so east is at page-top, draw the new north arrow and restate one relative-position fact without changing the place.

⚠ Safety

Keep all locations fictional. Do not ask students to identify their home cell on a real map.

Teacher notes

Some real map systems use other ordering conventions; consistency matters. This unit deliberately uses letter first. “Above” and “below” describe page position, while north and south describe mapped direction only when interpreted through the arrow.

Previous lesson · Unit overview · Next lesson

Lesson 4: Scale and choosing a route

Time: about 55 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: GPT-5.6 Sol.

Goal

Calculate route lengths on a square grid using a stated scale and compare routes using both distance and stated constraints.

Materials

Larkspur grid and route cards below, counters or string, paper, optional craft sticks representing 100 m segments.

Steps

✎ 1. Opening — 6 minutes

Draw two equal map segments. State that on one map a segment means 10 m and on another it means 100 m. Ask whether equal marks must mean equal ground distance. **No; read each map's scale.**

2. Scale and segments — 10 minutes

For this lesson, movement follows grid edges. One edge between adjacent intersections represents **100 m**. Count route segments, then multiply by 100 m. Four segments represent 400 m. Do not count visited points; four segments connect five points.

3. Larkspur route map — 14 minutes



Text equivalent: Top row A-B-C-D; middle E-F-G-H; bottom I-J-K-L. Vertical edges connect A-E-I, B-F-J, and D-H-L. Horizontal edges connect E-F-G-H and I-J-K-L. C-G is closed. F-G is open but has steps. Each drawn edge is 100 m.

Three route cards from Clinic A to Library D:

- **Route 1:** A–B–C–D.

- **Route 2:** A–E–F–G–H–D; F–G has steps.
- **Route 3:** A–E–I–J–K–L–H–D; described by the fictional town as quieter.

Students count and calculate: Route 1 = 3 segments = **300 m**; Route 2 = 5 segments = **500 m**; Route 3 = 7 segments = **700 m**.

4. Suitable for whom? — 13 minutes

Use fictional needs, not personal disclosures:

1. A courier needs the shortest open route. **Route 1, 300 m.**
2. A traveller needs a route with no steps. **Routes 1 or 3; Route 1 is shorter.**
3. A sound-sensitive visitor values the stated quieter route more than distance. **Route 3 may be suitable despite being longer.**
4. A guide proposes A–B–C–G–H–D. Is it usable? **No; C–G is closed.**

Emphasize: “shortest,” “step-free,” and “quietest among the labelled options” answer different questions. A map needs current, relevant information; it does not decide a person's needs.

5. Create and check a route — 7 minutes

Students write one valid route from E to L, count segments and calculate distance. **Example:** E–I–J–K–L = 4 segments = 400 m. Partners verify every edge is drawn and open.

✓ 6. Closing check — 5 minutes

1. A valid route has 8 edges. How far is it? **800 m.**
2. Why might a longer route be chosen? **It may avoid steps or a closure, be quieter, or meet another stated need.**

Vocabulary

- **Scale:** a relationship between map distance and ground distance.
- **Segment/edge:** one part of a route between adjacent points.
- **Route:** a connected path from a start to a destination.
- **Constraint:** a condition a route must meet.
- **Step-free:** not requiring use of stairs or steps.

Differentiation

- **Extra support:** place one 100 m craft stick per edge and count by hundreds; provide route cards already sequenced.
- **Extra challenge:** find all shortest open A-to-D routes and explain how a new closure at B–C changes the answer.

⚠ Safety

All routes and needs are fictional. Never require students to disclose disabilities, home locations or travel habits. Do not treat this paper exercise as safe real-world navigation advice.

Teacher notes

Distance must follow depicted route edges; straight-line distance through undrawn space is not a route. The scale uses edge length, not square area. Accessibility labels can be incomplete or outdated in real maps, so a map claim should be checked when consequences matter.

Previous lesson · Unit overview · Next lesson

Lesson 5: Make, test, revise

Time: about 55 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: GPT-5.6 Sol.

Goal

Create, test and revise a map for a stated audience, then apply the unit's ideas in an eight-task assessment.

Materials

Paper or digital drawing tool, rulers, symbol cards, peer-test checklist and assessment packet below. Offer raised-line paper, movable pieces, typing or oral description.

Steps

✎ 1. Opening — 5 minutes

Display: “A clear map is one its intended reader can use.” Ask why “looks beautiful” is not enough. **Example:** Symbols might be attractive but unexplained, or a route might omit a closure.

2. Design brief — 12 minutes

Students choose one fictional brief:

- help a visitor find the reading tent in Starling Fair;
- help a worker inspect three taps in Cloud Garden;
- help a performer move equipment by a step-free route in Moon Court.

Their map must include a title, stated audience/purpose, north arrow, at least two point symbols, one line symbol, one area symbol, a legend, a 3×3 or 4×4 letter-first grid, and a stated scale of one edge = 100 m. It must not depend on colour alone.

3. Reader test — 8 minutes

A partner answers without coaching:

1. What is this map for?
2. What do three symbols mean?
3. Give one feature's grid cell.
4. Follow one route and count its length.
5. Name one detail that remains unknown.

The author records where the reader hesitated. A failed test is useful evidence about the draft, not a score of the author.

4. Revise and explain — 7 minutes

Students make at least two changes and complete: “I changed ___ because the reader ___.” **Examples:** add a missing legend entry; separate two similar symbols; label a closed path; enlarge the north arrow; correct a route distance.

5. Assessment packet — 18 minutes

Use this fictional map:

```
                N ↑
          1       2       3
     A | Gate  | Lawn  | Pond  |
     B | Path  | Well  | Steps |
     C | Stage | Path  | Hall  |
Legend: Gate, Well and Stage = point symbols;
        Path = solid line through the named cell;
        Lawn and Pond = area symbols; Steps = stair location; Hall = building area.
Scale for edge-following routes: one cell-edge move north/east/south/west = 100 m.
```

Text equivalent: A1 gate, A2 lawn, A3 pond, B1 path, B2 well, B3 steps, C1 stage, C2 path and C3 hall. Rows A–C run north to south; columns 1–3 west to east. Routes may move between adjacent cells north/east/south/west, not diagonally. For Task 6 only, the stated route is A1–B1–C1–C2–C3. For Task 7, the direct B2–B3–C3 option includes steps, while B2–C2–C3 is step-free.

Complete exactly these eight tasks:

1. Explain one way this map differs from the place it represents.
2. Classify Gate, the route through Path cells, and Pond as point, line or area symbols.
3. State the grid reference of the Well using the unit's convention.
4. Name the cardinal direction from the Gate A1 to the Lawn A2.
5. Does the absence of a tree symbol prove that the place has no trees? Explain.
6. Calculate the length of A1–B1–C1–C2–C3.
7. Choose a stated route from Well B2 to Hall C3 for a traveller avoiding steps, and justify it.
8. Name one revision that would make this map clearer or more useful, and connect it to a reader or purpose.

6. Closing reflection — 5 minutes

Students finish: “One map choice I can now explain is ___; one thing I would still check is ___.” Accept oral, typed, drawn or arranged responses.

Answer guide

1. A map is a selected, simplified model; it does not reproduce every object, exact shape, height, sound or current condition. Accept one clear example.
2. Gate = point; route/path = line; Pond = area.
3. B2: letter row first, number column second. It locates the cell, not an exact point inside it.
4. East, because the north arrow makes page-right east.
5. No. A map can omit features because of purpose, scale, date or error.
6. A1–B1, B1–C1, C1–C2 and C2–C3 are 4 edges; 4 × 100 m = **400 m**.
7. B2–C2–C3 is 2 edges = 200 m and is stated step-free. B2–B3–C3 also has 2 edges but includes the Steps cell, so it does not meet the stated constraint.

8. Answers vary. Examples: distinguish point and area symbols more clearly; draw the actual line route; add a closure/date label; explain whether the Hall entrance is in C3; add a step-free symbol. The response must name how the change helps a reader or purpose.

Do not turn the guide into a validated pass mark. Look for patterns: a student who counts points rather than edges needs a different follow-up from one who ignores the legend.

Vocabulary

- **Audience:** the intended reader or user.
- **Draft:** a version made for testing and improvement.
- **Usability test:** observing whether a reader can use something for its purpose.
- **Revision:** a purposeful change after checking a draft.
- **Constraint:** a condition that a choice must meet.

Differentiation

- **Extra support:** provide a map frame, pre-cut symbols and sentence starters; let the student dictate labels or demonstrate routes with counters.
- **Extra challenge:** create two maps of the same fictional place for different audiences and justify three changed inclusions or omissions.

⚠ Safety

Use only invented places and routes. Do not collect home addresses, personal mobility information or identifiable daily journeys. No public posting or unsupervised fieldwork is part of the lesson.

Teacher notes

Praise useful revision rather than artistic polish. A reader's difficulty may reveal a legend or layout problem, but one reader does not represent everyone. Tactile and verbal maps are maps too; visual drawing is not the learning goal by itself.

Previous lesson · Unit overview

Grade 3 History, Geography and Society: Then and Now from Sources (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 12 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every activity against your school's rules.
>
> Text-checked by three other agents (Gemini 3.8 Flash, Gemini 4 Argon and Gemini 4 Carbon); see Known gaps.

Back to the grade 3 year plan - Term 2. Builds on grade 1 society: Then and now: timelines and old and new objects, grade 2 society: How letters changed: sources, the first stamps and the people who changed them, grade 3 society term 1: Maps, routes, and places, and the society progression

Big idea

We find out about the past from sources: things people made or wrote at the time, and memories told later. Putting events on a timeline shows what came first and what was happening at the same time. Two sources about the same day can agree on some things and differ on others, because different people made them for different reasons. Good history questions use more than one source.

This is the second society unit of grade 3 (term 2). Grade 1 put objects and pictures into "long ago, when grown-ups were small, now" and listened to a made-up memory (Mrs Okafor's). Grade 2 used sources about one real change, the first postage stamps. Grade 3 adds a timeline with real years and a scale, two things happening at the same time in different places, comparing daily life in one past year with life now, sorting kinds of sources, and a closer comparison of two sources about the same event (what both say, what only one says, and why they differ).

The town is the made-up Little Hill, used in earlier grades. Its past in this unit is made up too, but it follows a real pattern from the sources: in the 1920s many towns had electricity while many farms did not, and farms were connected years later. The past year studied is 1926, exactly 100 years before this unit was written. See Known gaps.

Outcomes

By the end of the unit most children can:

1. Put dated events on a timeline with a scale, and say what happened in town and on the farms at the same time (1926).
2. Work out how many years apart two events were, using the timeline or subtraction (for example 1948 - 1926 = 22 years).
3. Compare daily life for a made-up child in 1926 with a made-up child now, naming at least one thing that changed and one that stayed the same.
4. Name the kind of a source (picture, writing, object, map or memory) and say one thing it can tell us and one thing it cannot.

5. Say one thing two sources about the same day both tell us, and one thing only one of them tells us.
6. Give a reason why two sources differ (who made it, what they wanted, who it was for), and ask a question about the past that a source could answer.

Prior knowledge

- Grade 1 society term 2: long ago and now; old and new objects; a person remembering is a source; Mrs Okafor's memory of Little Hill School.
- Grade 2 society term 2: a source can be a picture, an object, a letter or an account; dated events in order (1835-1841).
- Grade 3 society term 1: maps with a key, direction and a grid. Lesson 3 uses a simple map of Little Hill in 1926.
- Grade 3 mathematics term 1: adding and taking away within 1000 and counting in tens. Lesson 1 uses differences between years.
- An adult reads every source aloud. Children may follow the printed copy but do not need to read it alone.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week.

1. Putting Little Hill's past in order: a floor timeline from 1880 to 2030 (10 cm for every 10 years); nine event cards; what happened at the same time in 1926; how many years between events.
2. A day in 1926 and a day now: Iris (a made-up girl on a farm near Little Hill in 1926) and Leo (a made-up boy in Little Hill now); six pairs of daily-life cards; changed or stayed the same.
3. What kind of source is it?: six made-up sources about Little Hill in 1926 (a photograph, a diary page, a newspaper report, an object, a map and a memory told later); what each can and cannot tell us; who each was made for.
4. Two sources, one day: the evening the electric lamps were first lit on Main Street, 6 November 1926, told by the newspaper and by Iris's diary; sorting statements into "both say", "only the newspaper" and "only the diary"; why they differ.
5. Questions from many sources: pairs ask questions about the sources and the people in them; "our sources answer it" or "we need another source"; a new source from 1948; a class "Little Hill then and now" display.

Materials (whole class unless noted)

- A floor or wall timeline strip at least 160 cm long, marked from 1880 to 2030 with a mark every 10 cm for every 10 years, drawn by the teacher from the description in lesson 1 (all lessons).
- Nine event cards, from the list in lesson 1, one large set for the class timeline and one small set per pair (lessons 1, 5).
- A metre stick or a 30 cm ruler (lesson 1).
- Blu-tack or masking tape (lessons 1, 2, 3, 5).
- Twelve daily-life picture cards (six pairs, Iris and Leo), from the list in lesson 2, one set per pair, and a large "Changed / Stayed the same" chart (lesson 2).
- Two large name cards: "Iris, 1926" and "Leo, now", each with a simple face drawing (lessons 2-5).

- Six source cards, from the texts in lesson 3: a photograph drawing, Iris's diary page, the Little Hill News report, an oil lamp picture card, a map of Little Hill in 1926 and Iris's memory told in 1990; one large set for the class and one small set per group of four (lessons 3, 5), plus one extra small diary card and newspaper card per pair (lesson 4).
- Five kind-of-source labels: picture, writing, object, map, memory, and a three-column "Can tell us / Can't tell us / Made for" sheet per group (lesson 3).
- Eight statement strips, from the list in lesson 4, one set per pair, and a three-column sorting mat per pair ("Both say", "Only the newspaper", "Only the diary"), and a large copy of the mat for the class (lesson 4).
- A seventh source card, the 1948 Little Hill News notice, from the text in lesson 5 (lesson 5).
- A large sheet titled "Our questions", split into "Our sources answer it" and "We need another source", and five question starter cards (Who, Why, When, How, What happened to) (lesson 5).
- Paper strips or sticky notes, pencils and crayons (lessons 1, 2, 3, 4, 5).
- A large sheet for the class display "Little Hill then and now" (lesson 5).
- For blind or low-vision children: a raised-line timeline (a string or puffy-paint line with a raised dot every 10 cm and large-print or braille years every 50 years), large-print or braille copies of the event cards, source texts and statement strips, a piece of corrugated card to feel the ridges of a washboard (lesson 2), a raised-line version of the 1926 map and of the oil lamp outline (lesson 3), and a sorting mat with raised lines between the columns (lessons 3, 4) (all lessons unless noted).

⚠ Safety and access

- **Privacy.** Never ask what children's own homes have (lights, a fridge, a washing machine, a phone), how their families travel, or what their relatives did in the past. Every home and family in this unit belongs to a made-up character. Children may share family stories only if they choose to; do not write them down or display them.
- **"Now" is not the same for everyone.** Leo's home in Little Hill has electricity, a fridge and a washing machine. Say "in Leo's home" rather than "in homes now": some families today do not have these things, and in many places in the world farms still have no electricity.
- **No real lamps or flames.** The oil lamp is a picture card only. Do not bring in a lamp with fuel, and never light one in class.
- **Moving on the timeline.** Placing cards on a floor timeline can be done from a chair with a pointer, or by telling a partner where to put the card. Leave a clear path round the strip for wheelchairs, or put the strip on a wall at seated height.
- **Feelings about the past.** In lesson 4 the lamplighter, Mr Gale, loses his job of lighting the gas lamps. Keep it gentle: say he found other work (Iris's memory in lesson 3 says he became the school caretaker), and let any child step out of the discussion.
- Children can answer by speaking, signing, pointing, using AAC, drawing, or with a partner who writes for them. Their own way counts.
- Deaf children: show each source while it is read, and face the class when reading aloud; give printed copies. Blind and low-vision children: use the raised-line timeline and the large-print or braille copies listed in Materials; describe each picture card in words. Colour is never the only clue (the two strands on the timeline are above and below the line, not only in two colours).

Assessment

Watch and listen during lessons, and use the closing checks. During lesson 5 or the following week, see each child for about 4 minutes with the timeline, the cards and the source cards (answers in brackets):

1. Give four event cards (bridge 1895, station 1910, Main Street lamps 1926, farms get electricity 1948): "Put these on the timeline." "In 1926, what was different in town and on the farms?" (In order 1895, 1910, 1926, 1948. The town had electric street lamps; the farms still had no electricity, only oil lamps and candles.) (Outcome 1.)
2. "How many years after the Main Street lamps did the farms get electricity?" (22 years: 1948 - 1926, or counting on 4 to 1930, then 10 to 1940, then 8 to 1948.) (Outcome 2.)
3. Show the "light" pair and the "washing clothes" pair of Iris and Leo cards: "What changed? Tell me one thing that stayed the same for Iris and Leo." (Changed: oil lamp to electric light; washboard and wringer to washing machine. Same: for example both go to Little Hill School, both play hopscotch, both help at home.) (Outcome 3.)
4. Show the photograph, the oil lamp card and Iris's memory: "What kind of source is each one? Tell me one thing one of them can tell us, and one thing it can't." (Picture, object, memory. For example the photograph shows what Main Street looked like but not what people said or felt; the memory tells feelings but was told 64 years later, so some details may be forgotten.) (Outcome 4.)
5. Read the two short sources from lesson 4 again: "Tell me one thing both say, and one thing only Iris's diary says." (Both: the lamps came on at six o'clock on Main Street, many people came. Only the diary: it rained; the lamps were not as bright as Iris expected; the farm would not get electricity; Mr Gale looked sad.) (Outcome 5.)
6. "Why do you think they tell the day differently?" (The newspaper was written for the whole town to read and wanted to tell good news; Iris wrote for herself and wrote what she saw and felt; she lived on a farm. Any reason about who made it, why, or for whom counts.) "Ask me one question about Little Hill in 1926." "Which source could help answer it?" (Any sensible question and source.) (Outcome 6.)

Record "yes", "with help" or "not yet" for each outcome. A child who can do it in their own way (pointing, signing, AAC) gets "yes".

Sources

The C3 framework was read in the archived PDF (pages with the grades 3-5 history indicators): https://web.archive.org/web/20220403055307/https://www.socialstudies.org/sites/default/files/2017/Jun/c3-framework-for-social-studies-rev0617.pdf

The indicators used, quoted from the framework (the unit is not a full alignment):

- D2.His.1.3-5: "Create and use a chronological sequence of related events to compare developments that happened at the same time." (Lesson 1.)
- D2.His.2.3-5: "Compare life in specific historical time periods to life today." (Lesson 2.)
- D2.His.3.3-5: "Generate questions about individuals and groups who have shaped significant historical changes and continuities." (Lesson 5.)
- D2.His.6.3-5: "Describe how people's perspectives shaped the historical sources they created." (Lesson 4.)
- D2.His.9.3-5: "Summarize how different kinds of historical sources are used to explain events in the past." (Lesson 3.)

- D2.His.10.3-5: "Compare information provided by different historical sources about the past." (Lesson 4.)
- D2.His.11.3-5: "Infer the intended audience and purpose of a historical source from information within the source itself." (Lessons 3, 4.)
- D2.His.12.3-5: "Generate questions about multiple historical sources and their relationships to particular historical events and developments." (Lesson 5.)

Real facts behind the made-up Little Hill story come from Wikipedia articles, read on 12 November 2026:

- "Rural electrification": https://en.wikipedia.org/wiki/Rural_electrification ("Despite widespread electricity in cities, by the 1920s electricity was not delivered by power companies to rural areas because of the general belief that the infrastructure costs would not be recouped." and "Of the 6.3 million farms in the United States in January 1925, only 205,000 were receiving centralized electric services." The same article says that in Ireland most towns were connected in the 1930s and the countryside from the early 1950s, and that from 1935 a United States government agency made "long-term, self-liquidating loans to state and local governments, to farmers' cooperatives, and to nonprofit organizations".) Used for the town having electric lamps in 1926 while the farms waited until 1948, and for the farmers' group in lesson 5.
- "Kerosene lamp": https://en.wikipedia.org/wiki/Kerosene_lamp (such lamps are "useful for lighting without electricity"). Used for Iris's oil lamp.
- "Icebox": https://en.wikipedia.org/wiki/Icebox ("a common early-twentieth-century kitchen appliance before the development of safely powered refrigeration devices", with "large chunks of ice" added "every several days"). Used for Iris's icebox and the ice cart.
- "Washboard (laundry)": https://en.wikipedia.org/wiki/Washboard_(laundry) ("a tool designed for hand-washing clothing") and "Mangle (machine)": https://en.wikipedia.org/wiki/Mangle_(machine) (a wringer "was used to squeeze the water out of wet washing"). Used for washing day in 1926.
- "Primary source": https://en.wikipedia.org/wiki/Primary_source (a source "created at the time under study"; "accounts written after the fact with the benefit of hindsight are secondary"). Used for the teacher note on Iris's memory told in 1990.
- "Timeline": https://en.wikipedia.org/wiki/Timeline ("a list of events displayed in chronological order"; many use "a linear scale, in which a unit of distance is equal to a set amount of time"). Used for the 10 cm scale.

Known gaps and cautions

- Three other agents text-checked this unit on 2026-11-12: Gemini 3.8 Flash (at c0a59de) and Gemini 4 Argon (re-checked at f9d319a) reported no errors; Gemini 4 Carbon (at bbbdbc6) reported three small errors (lesson 4 copy counts and materials, a progression wording, and which C3 history indicators are grades 3-5), all fixed in 9ea2f9c and diff re-checked by Gemini 4 Carbon (and, as reported, Gemini 4 Argon). Those are text checks by AI agents, not teacher reviews or classroom tests.
- Little Hill, its people (Iris, Leo, Mr Gale, the mayor Mrs Hart) and all its sources are made up by the author. The sources are written to look like real ones, but they are **not** real 1926 sources; tell the children so. The general pattern (towns before farms, oil lamps, iceboxes, washboards) comes from the Wikipedia articles above, which describe the United States and Ireland; when farms got electricity was different in different countries and is still not finished everywhere.

- The years of Little Hill's events (1890 school, 1895 bridge, 1910 station, 1926 lamps and second classroom, 1948 farms, 1956 Mrs Okafor starts school, 1975 library, 2005 computers) are made up. Mrs Okafor and the gas lamps match the grade 1 unit, where she started school "about 70 years ago".
- Iris's memory is told in 1990, 64 years after 1926. The unit calls it "a memory told later" and does not teach the words "primary" and "secondary"; that is left for later grades in the society progression.
- The comparison in lesson 2 is between one made-up child then and one made-up child now. It is not a fair picture of every child in 1926 or now.
- The grades 3-5 indicators C3 D2.His.4, D2.His.5, D2.His.13, D2.His.14, D2.His.16 and D2.His.17 (perspectives across a period, using sources as evidence for claims, causes and effects) are not covered; the year plan puts a longer "then and now" project in term 3.
- The sources are read aloud. The unit does not use the grade 3 literacy letter sequence, because adults read the texts; it does not teach reading.
- The lesson order, the made-up story, the card wording and the timings are the author's choices, not taken from a source.

Lesson 1: Putting Little Hill's past in order

Unit overview - Next: Lesson 2

About 40 minutes.

Goal

Children put dated events from the made-up town of Little Hill on a timeline with a scale, find two things that happened at the same time, and work out how many years apart two events were.

Materials

- The timeline strip: paper at least 160 cm long, taped to the floor or a wall at seated height. Draw a line along it. Starting 5 cm from the left end, mark 1880, then a mark every 10 cm for every 10 years (1890, 1900 …) up to 2030, 150 cm from 1880. Write the year under every mark. Write "School" above the line at the left end and "Town and farms" below it.
- Nine large event cards (below) for the class timeline, and one small set per pair.
- A metre stick or a 30 cm ruler.
- Blu-tack or masking tape, and a sticky note for "Now".
- Paper strips and pencils for the closing check.
- For blind or low-vision children: the raised-line timeline (a raised dot every 10 cm and large-print or braille years every 50 years) and large-print or braille event cards.

The nine event cards (made up)

Each card has the year in large numbers, one sentence and a simple drawing. The letter in brackets is for the teacher. "Above" means the School strand; "below" means the Town and farms strand.

- (A) **1890:** Little Hill School opens with one classroom. (Above.) Drawing: a small school with one door.
- (B) **1895:** The stone bridge over the river is built. (Below.) Drawing: a stone bridge.
- (C) **1910:** The railway station opens. (Below.) Drawing: a station with a steam train.
- (D) **1926:** Electric lamps take the place of the gas lamps on Main Street. (Below.) Drawing: a street lamp with a wire.
- (E) **1926:** Little Hill School gets a second classroom. (Above.) Drawing: the school with two doors.
- (F) **1948:** The farms around Little Hill get electricity. (Below.) Drawing: wires on poles going to a farmhouse.
- (G) **1956:** Mrs Okafor starts at Little Hill School. (Above.) Drawing: a girl with a school bag and a hand bell.
- (H) **1975:** Little Hill library opens. (Below.) Drawing: a building with books in the window.
- (I) **2005:** Little Hill School gets its first computers. (Above.) Drawing: a computer on a desk.

Where each card goes, measured from 1880: A 10 cm, B 15 cm, C 30 cm, D and E 46 cm, F 68 cm, G 76 cm, H 95 cm, I 125 cm. Now (2026) is at 146 cm.

Steps

✎ Opening (5 min)

Show the strip. Say: "This is a **timeline**. Every 10 centimetres stands for 10 years. That is its **scale**." Put a finger on 1880 and walk it along, counting in tens: "1890, 1900, 1910 ..." to 2030. Ask: "Where is now, 2026?" (Between 2020 and 2030, a little past the middle; 146 cm from 1880.) Stick a "Now" note there.

Say: "Remember Little Hill, and Mrs Okafor who went to school there? This week we find out about Little Hill long ago. The town and its story are made up, but the way things changed is like what happened in many real places."

✎ Main activity (25 min)

1. **Place the cards (12 min).** Give each pair one or two large cards. Read each card aloud. The pair finds its year on the strip (counting in tens, then on in ones; for 1926, find 1920, then count 6 more centimetres) and sticks the card at its place: above the line for School cards, below for Town and farms cards. Check with the metre stick. Everyone checks with a thumbs up or asks "Why there?"
2. **Same time, different places (6 min).** Ask: "Find two things that happened in the same year." (D and E, in 1926.) "In 1926, the town had new electric lamps. Did the farms have electricity in 1926?" (No; card F says the farms got it in 1948.) "So for some years, the town had electric light and the farms did not. From which year to which year?" (From 1926 to 1948.) Run a finger along the strip between D and F.
3. **How many years apart? (7 min).** Pairs use their small sets and the class strip to answer, by counting on in tens and ones or by taking away:
    - "How many years between the bridge and the station?" (1910 - 1895 = 15.)
    - "How many years did the farms wait after the town got electric lamps?" (1948 - 1926 = 22.)
    - "How long after the school opened did Mrs Okafor start there?" (1956 - 1890 = 66.)
    - "How many years ago was 1926?" (2026 - 1926 = 100: one hundred years ago.)

    Pairs who finish make up one question for another pair.

✓ Discussion questions (5 min, with answers)

1. "Which came first, the station or the electric lamps on Main Street? How does the timeline show it?" (The station, 1910; it is further to the left, nearer 1880.)
2. "Why might the farms have got electricity later than the town?" (Accept ideas. The farms are far apart, so the wires and poles cost more for each house; in many real countries, towns got electricity before farms.)
3. "What does the space between two cards tell us?" (How long it was between them: more space means more years.)

✓ Closing check (5 min, with answers)

Each child gets a paper strip and answers two questions in their own way (writing, drawing or telling an adult):

1. "Which two things happened in 1926?" (The electric lamps on Main Street and the second school classroom.)
2. "Which happened first, the library or the farms getting electricity?" (The farms, in 1948; the library opened in 1975.)

Collect the strips to see who needs help with the scale.

Vocabulary

timeline, scale, year, before, after, at the same time, how many years, electricity, gas lamp, farm

Differentiation

- **Support:** place cards with an adult, using only the hundreds and tens first ("1926 is after 1920"); use only the cards A, D, F and I; count the years between events by stepping along the 10 cm marks.
- **Stretch:** "How many years from the school opening to the first computers?" (2005 - 1890 = 115.) Add a card for a made-up event in 2030, then explain where it goes.
- **Tactile:** blind and low-vision children use the raised-line timeline, feel the raised dots to count in tens, and place large-print or braille cards with a partner.

⚠ Safety

- Keep the floor strip taped flat so nobody trips; children kneel or reach from chairs and do not walk on it. Leave a clear path for wheelchairs.

Teacher notes and misconceptions

- Some children think a bigger year is "longer ago". Point out that the years get bigger as we walk towards now.
- 1926 sits 46 cm from 1880, not 26 cm: the count starts at 1880, not 1900. Count the tens together before measuring.
- Two events in the same year go at the same place, one above and one below the line. This is the point of the two strands: to compare what happened in different places at the same time.
- Tell the children clearly that Little Hill and its events are made up. The idea that towns often got electricity before farms is real (see Sources in the unit overview).

Lesson 2: A day in 1926 and a day now

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 40 minutes.

Goal

Children compare daily life for Iris, a made-up girl on a farm near Little Hill in 1926, with daily life for Leo, a made-up boy in Little Hill now, and sort what changed and what stayed the same.

Materials

- The timeline from lesson 1, with its "Now" note.
- Two large name cards: "Iris, 1926" (a girl aged 9, on a farm near Little Hill) and "Leo, now" (a boy aged 9, in Little Hill), each with a simple face drawing.
- Twelve daily-life picture cards (six pairs, below), one set per pair. Each card has a drawing and one sentence for the adult to read.
- A large "Changed / Stayed the same" chart with a column for each, and a space between them for "Some of both".
- Sticky notes, pencils and crayons.
- Blu-tack, to put the name cards on the timeline.
- A piece of corrugated card (to feel the ridges of a washboard).
- For blind or low-vision children: large-print or braille copies of the card sentences.

The six pairs of cards (made up)

1. **Light.** Iris: "When it gets dark, my mum lights the oil lamp. I am not allowed to touch it." Leo: "When it gets dark, I press the switch and the light comes on."
2. **Keeping food cold.** Iris: "We keep milk and butter in the icebox. The ice cart brings a big block of ice from town every few days." Leo: "We keep milk and butter in the fridge. It is plugged in to the electricity."
3. **Washing clothes.** Iris: "Monday is washing day. We scrub the clothes on a washboard, then turn the handle of the wringer to squeeze the water out." Leo: "In my home, the washing machine washes the clothes and spins the water out."
4. **Going to school.** Iris: "I walk 3 kilometres down the farm lane to Little Hill School. This year it has a new second classroom." Leo: "I walk for 10 minutes to Little Hill School. It has computers."
5. **Sending a message.** Iris: "To tell my aunt in Big Harbour our news, I write a letter and we post it in town." Leo: "To tell my aunt in Big Harbour our news, we send a message on a phone."
6. **Playing.** Iris: "At break we play hopscotch in the school yard." Leo: "At break we play hopscotch in the school yard."

Steps

✎ Opening (5 min)

Show the two name cards. Put "Iris, 1926" on the timeline at 1926 and "Leo, now" at the Now note. Ask: "How many years apart are Iris and Leo?" (100.) Say: "In 1926, did Iris's farm have electricity?" (No; the farms got it in 1948.) "Today we compare one day for Iris and one day for Leo. They are both made up, but Iris's things are like real things from 100 years ago."

✎ Main activity (25 min)

1. **Read the pairs (8 min).** Read each pair aloud and show the drawings. Pass round the corrugated card: "A washboard had ridges like this. You rubbed the wet clothes up and down on it." For the icebox, explain: "It was a cupboard with thick walls. The block of ice inside kept it cold until it melted."
2. **Sort (10 min).** Pairs lay out the twelve cards in pairs, Iris on the left and Leo on the right, and decide for each pair: did it **change**, did it **stay the same**, or is it **some of both**? They put a sticky note on the class chart with the pair's name (for example "Light") in the column they choose, and say why.
3. **Same need, new way (7 min).** Ask: "Iris and Leo both keep food cold. What changed?" (The way: an icebox with ice, or a fridge with electricity.) Do the same for light, washing and messages. Write on the chart: "The **need** stayed the same. The **way** changed." Ask: "Which changes need electricity?" (The light, the fridge, the washing machine and the phone.) Link back to lesson 1: Iris's farm had no electricity in 1926.

✓ Discussion questions (5 min, with answers)

1. "What stayed the same?" (Both play hopscotch, both go to Little Hill School, both keep food cold, both send news to an aunt; accept others with a reason.)
2. "What changed the most, do you think? Why?" (Any choice with a reason; for example washing, because it took Iris a whole day.)
3. "Iris lived on a farm. Would a child in the town of Little Hill in 1926 have the same light as Iris?" (Maybe not: Main Street had electric lamps from 1926, so some town homes might have had electric light. Our cards don't tell us; that is a question for another source.)

✓ Closing check (5 min, with answers)

Each child draws or writes, or tells an adult:

1. One thing that changed between Iris and Leo. (For example "Iris had an oil lamp; Leo has an electric light.")
2. One thing that stayed the same. (For example "They both play hopscotch.")

Vocabulary

changed, stayed the same, then, now, icebox, washboard, wringer, oil lamp, electricity, need, way

Differentiation

- **Support:** sort only three pairs (light, washing, playing) with an adult; use the sentence frame "In 1926 Iris ... Now Leo ...".
- **Stretch:** add a seventh pair of their own (for example cooking or keeping warm) and say whether Iris's way needed electricity. Write a short diary sentence as Iris.
- **Tactile:** blind and low-vision children feel the corrugated card and use large-print or braille copies of the card sentences.

⚠ Safety

- The oil lamp is talked about and drawn, never brought in or lit.
- Never ask what children's own homes have. Talk only about Iris's and Leo's homes. If a child says their home has no washing machine or fridge, accept it calmly: "Homes are different now too."

Teacher notes and misconceptions

- Children may think everyone in 1926 lived without electricity. In Little Hill the town had electric street lamps from 1926; Iris's farm did not. Real sources say many towns had electricity in the 1920s while many farms did not (see Sources in the unit overview).
- Children may say "people were poor" or "people were not clever then". Say: "They did clever things with what they had. The icebox was a clever way to keep food cold without electricity."
- Leo is one made-up child. Say "in Leo's home", not "in all homes now".

Lesson 3: What kind of source is it?

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 40 minutes.

Goal

Children meet six made-up sources about Little Hill in 1926, sort them into kinds (picture, writing, object, map, memory), and say what each can tell us, what it cannot, and who it was made for.

Materials

- The timeline from lesson 1, with the Iris and Leo name cards from lesson 2.
- Six source cards (texts and descriptions below): one large set for the class and one small set per group of four. Also print one extra small diary card and newspaper card per pair for lesson 4. Each card says at the top: "Made up for this lesson".
- Five kind-of-source labels: picture, writing, object, map, memory.
- A "Can tell us / Can't tell us / Made for" sheet per group (three columns), and pencils.
- Paper strips for the closing check.
- Blu-tack, to put the memory card on the timeline.
- For blind or low-vision children: large-print or braille copies of the source texts, a raised-line version of the map (string for the river, puffy-paint dots for the lamps) and of the lamp outline, and a sorting mat with raised lines between the columns.

The six source cards (made up)

1. **Photograph (a drawing that looks like an old photo).** Main Street in November 1926: a new electric street lamp on a pole with a wire, a horse and cart, one motor car, a baker's shop, and people in coats and hats. Written on the back: "Main Street, the week the new lamps came. Taken for the Little Hill News."
2. **Iris's diary page.** Read aloud:

   Saturday 6 November 1926. Today we went into town on the cart to see the new lamps. It rained all the way. There were lots of people on Main Street. At six o'clock Mrs Hart the mayor pulled a lever and the lamps came on. Everyone cheered. I thought they would be bright like the sun, but they were only a bit brighter than the gas lamps. Dad says the wires will not come to our farm for years and years. Mr Gale the lamplighter stood at the back. He looked sad. We got home wet.

1. **Newspaper report.** Read aloud:

   LITTLE HILL NEWS, Monday 8 November 1926. LIGHT AT LAST ON MAIN STREET! On Saturday evening a great crowd filled Main Street to see the new electric lamps. At six o'clock exactly, the mayor, Mrs Hart, pulled the lever and twelve lamps shone out. "Little Hill is a modern town now," she said. The lamps will shine every night, and

nobody will need to light them by hand. Shops on Main Street will stay open later in winter. Buy your electric lights at Penn's Hardware, Main Street!

1. **Object: an oil lamp (picture card).** A drawing of an oil lamp: a metal base to hold the oil, a wick, and a tall glass chimney. Label: "Oil lamp from Brook Farm, near Little Hill. Used every evening until 1948. Now in the Little Hill museum."
2. **Map: Little Hill in 1926.** Drawn by the teacher: the river across the middle, the stone bridge, the railway and the station, Main Street with twelve small lamp symbols, the school, and a lane going out of town to Brook Farm. Key: lamp, school, station, bridge, farm. Title: "Little Hill: where the new lamps will go. For the town council, 1926."
3. **A memory told later.** Read aloud:

   Iris Brook, aged 73, told this to a pupil at Little Hill School in 1990: "I was nine when the lamps came on in Little Hill. It was a lovely dry evening and the whole town was there. The lamps were so bright! Mr Gale, the lamplighter, didn't light lamps any more after that; he became the caretaker at the school. We waited a long time for electricity on our farm. When it came, in 1948, the first thing my mother bought was an electric iron."

Steps

✎ Opening (5 min)

Say: "A **source** is something that tells us about the past. In grade 2 we used pictures, objects and accounts. Today we have six sources about Little Hill in 1926. They are made up for these lessons, but they are like real sources." Ask: "Who remembers a source we used before?" (For example Mrs Okafor's memory, the old objects, the first stamp.)

✎ Main activity (25 min)

1. **Meet the sources (10 min).** Show each large card and read it aloud, or describe the picture. After each one, ask: "When was it made? Who made it?" (Photograph: 1926, for the newspaper. Diary: 6 November 1926, Iris. Newspaper: 8 November 1926, the Little Hill News. Lamp: used until 1948, label written later by the museum. Map: 1926, for the town council. Memory: told in 1990 by Iris, aged 73.) Put the 1990 memory on the timeline: "This was told 64 years after 1926."
2. **Sort by kind (5 min).** Groups lay out their small set under the five labels. (Photograph: picture. Diary and newspaper: writing. Oil lamp: object. Map: map. Iris's memory: memory.) Two cards go under "writing".
3. **Can tell, can't tell, made for (10 min).** Each group takes one source (give the six out across the groups; repeat if there are more than six groups) and fills the three columns. Example answers:
   - Photograph: can tell what Main Street looked like, a horse and cart and a car together; can't tell what people said, felt, or heard; made for the newspaper's readers.
   - Diary: can tell what Iris saw and felt, the rain; can't tell what everyone else thought; made for Iris herself.

- Newspaper: can tell the time, how many lamps, what the mayor said; can't tell how a farm family felt; made for the people of the town who bought the paper (and it sells lights for a shop).
- Oil lamp: can tell how a farm lit its rooms; can't tell who used it or what they thought; made to light a room (the label was made for museum visitors).
- Map: can tell where the lamps, the school and the farm were; can't tell what it was like to be there; made for the town council.
- Memory: can tell feelings and what happened later (Mr Gale, the iron); can't be sure every detail is right, because it was told long after; told to a pupil for a school project.

Each group reads its row to the class.

✓ Discussion questions (5 min, with answers)

1. "Which sources were made in 1926, at the time?" (The photograph, the diary, the newspaper and the map. The lamp was made and used then, but its label was written later.)
2. "Iris's memory was told 64 years later. Is anything in it hard to be sure about?" (Small details, like the weather or how bright the lamps were, might be remembered differently after a long time. We can check them with other sources; lesson 4 will.)
3. "Why do we need more than one source?" (Each source tells only part of the story; together they tell more.)

✓ Closing check (5 min, with answers)

Hold up three cards one at a time: the oil lamp, the newspaper, the map. Each child writes or shows on a strip, or tells an adult, the kind of each (object, writing, map). Then: "Tell me one thing the map can't tell us." (For example what people felt, what the weather was, what anyone said.)

Vocabulary

source, picture, writing, object, map, memory, diary, newspaper, made for, at the time, told later

Differentiation

- **Support:** sort only four cards (photograph, diary, oil lamp, map); use the frame "This is a … It tells us …".
- **Stretch:** "Which source would you trust most about the weather that evening? Why?" (The diary, written that same day, says it rained; the memory says dry, but was told 64 years later.)
- **Tactile:** blind and low-vision children use the raised-line map and lamp outline, large-print or braille texts, and the raised-line sorting mat.

⚠ Safety

- The oil lamp is a picture card only. Do not bring in a real lamp.

Teacher notes and misconceptions

- Tell the children the sources are made up for these lessons, so they do not think Little Hill is real.
- Historians often call sources made at the time "primary" and accounts made later "secondary" (see "Primary source" in the unit overview's Sources). The unit says "made at the time" and "told later" instead; the words can come later.
- A source made later is not useless: Iris's memory is the only source here that tells what happened to Mr Gale and when the farm got electricity.
- The newspaper ends with an advert. Children may notice that the newspaper wanted people to like the new lamps; this leads into lesson 4.

Lesson 4: Two sources, one day

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 40 minutes.

Goal

Children compare what two sources tell about the same evening (the electric lamps first lit on Main Street on Saturday 6 November 1926), sort what both say and what only one says, and give reasons why the sources differ.

Materials

- The large diary card and newspaper card from lesson 3 (texts in lesson 3).
- One small diary card and newspaper card per pair (the extra pair copies printed with the lesson 3 sets).
- Eight statement strips (below), one set per pair.
- A three-column sorting mat per pair: "Both say", "Only the newspaper", "Only the diary".
- A large copy of the same mat for the class.
- The Iris name card from lesson 2.
- A board or chart paper for the two-column "Newspaper" / "Diary" answers.
- Paper and pencils for the closing check and the stretch writing.
- For blind or low-vision children: large-print or braille copies of the two sources and the strips, and a sorting mat with raised lines between the columns.

The eight statement strips

1. The lamps came on at six o'clock.
2. The lamps were on Main Street.
3. The mayor, Mrs Hart, pulled a lever.
4. There were twelve lamps.
5. Shops on Main Street will stay open later in winter.
6. The mayor said, "Little Hill is a modern town now."
7. It rained.
8. The lamps were only a bit brighter than the gas lamps.

Answer key: Both say: 1, 2, 3. Only the newspaper: 4, 5, 6. Only the diary: 7, 8.

Steps

✎ Opening (5 min)

Hold up the diary and the newspaper. Ask: "What day are both of these about?" (Saturday 6 November 1926, the evening the electric lamps were first lit.) "Who made each one?" (Iris, aged 9, from a farm; the Little Hill News.) Say: "Today we are detectives. Do they tell the same story?"

✎ Main activity (25 min)

1. **Read both again (6 min).** Read the newspaper aloud, then the diary. Pairs follow on their small cards. After each, ask one child to retell it in one sentence.
2. **Sort the strips (9 min).** Read each strip aloud. Pairs find it in one or both sources and put it in a column of their mat. Then go through the class mat together and check with the answer key. Ask pairs to point to the words in the source that prove each one.
3. **Why are they different? (10 min).** Ask these detective questions and write the answers in two columns, "Newspaper" and "Diary":
   - "Who made it?" (A newspaper writer in town; Iris, a girl from a farm.)
   - "Who was it made for?" (People in the town who read the newspaper; Iris herself.) "What clue in the newspaper tells you?" (It talks to the reader: "Buy your electric lights at Penn's Hardware".)
   - "What did they want to say?" (The newspaper: good news, "Light at last", the town is modern. Iris: what she saw and felt, the rain, being a bit disappointed.)
   - "What did Iris notice that the newspaper did not?" (The farm would not get the wires; Mr Gale looked sad.) "Why might Iris notice that?" (She lives on a farm with no electricity; she saw Mr Gale at the back.)

   Say: "The two sources were made by different people for different reasons, so they tell the same evening in different ways. Both can be useful."

✓ Discussion questions (5 min, with answers)

1. "The newspaper doesn't say it rained. Does that mean it didn't rain?" (No. It just doesn't say. A source can leave things out.)
2. "Which source tells us more about how a farm family felt? Why?" (The diary, because Iris's family lived on a farm and she wrote down her feelings.)
3. "In lesson 3, Iris's memory from 1990 said it was a dry evening. Her diary from that day says it rained. Which would you believe about the weather, and why?" (Most children choose the diary, written the same day; the memory was told 64 years later, and small details can be forgotten. Accept any choice with a reason.)

✓ Closing check (5 min, with answers)

Each child says, signs, writes or points to answer:

1. "Tell me one thing both sources say." (The lamps came on at six; on Main Street; the mayor pulled a lever.)
2. "Tell me one thing only the diary says." (It rained; the lamps were only a bit brighter; the farm would not get wires; Mr Gale looked sad.)

Vocabulary

compare, both, only, same, different, newspaper, diary, made for, reason, leave out, believe

Differentiation

- **Support:** sort four strips only (1, 4, 7 and 3) with an adult; use the frame "Both say ..." and "Only the diary says ...".
- **Stretch:** write two sentences as a newspaper writer who lived on a farm. How would the report change? Or write one strip of their own for a partner to sort.
- **Tactile:** blind and low-vision children use large-print or braille copies and the raised-line sorting mat.

⚠ Safety

- Mr Gale loses his lamplighting job when the gas lamps go. Keep it gentle: if children worry, read the line from Iris's memory (lesson 3) that he became the school caretaker. Any child may step out of the discussion.

Teacher notes and misconceptions

- Children may think one source is "right" and the other "wrong". Most of the differences here are not mistakes: each source chose different things to tell. Only the weather is a real disagreement, and that is between the diary and the memory, not the newspaper.
- "Twelve lamps" is only in the newspaper, but the lesson 3 map also shows twelve lamp symbols. That is a third source agreeing; mention it if a child notices.
- The advert is a clue to the newspaper's audience and purpose (C3 D2.His.11). Keep it light: newspapers often carried adverts.

Lesson 5: Questions from many sources

Unit overview - Previous: Lesson 4

About 40 minutes, plus about 4 minutes per child for the one-to-one check during the week.

Goal

Children ask questions about the Little Hill sources and the people in them, decide which questions the sources can answer, use a new source from 1948, and make a class "Little Hill then and now" display.

Materials

- The timeline from lesson 1 with its nine event cards and the Iris and Leo name cards.
- One small set of the six source cards from lesson 3 per group of four, and the large set.
- The 1948 Little Hill News notice (text below), one large copy and one small copy per group.
- A large sheet titled "Our questions", split into "Our sources answer it" and "We need another source".
- Five question starter cards: Who, Why, When, How, What happened to.
- Blu-tack or masking tape, to add the 1948 notice to the timeline.
- Sticky notes or paper strips, pencils and crayons.
- A large sheet titled "Little Hill then and now" for the display.
- The small event card sets from lesson 1, for the support group.
- The cards needed for the one-to-one check (see Assessment in the unit overview).
- For blind or low-vision children: large-print or braille copies of all the sources, the raised-line timeline, and a partner or adult to write their questions down.

The 1948 notice (made up)

Read aloud:

> LITTLE HILL NEWS, Monday 3 May 1948. WIRES REACH THE FARMS Electricity came to eleven farms near Little Hill last week, Brook Farm among them. In 1946 the farmers formed the Little Hill Farmers' Group and borrowed money together to pay for the poles and wires. Workers from Big Harbour put up 200 poles along the farm lanes. "We waited a long time," said Mr Brook of Brook Farm, "but tonight we have light at the touch of a switch."

Steps

✎ Opening (5 min)

Point to the 1926 cards and the 1948 card on the timeline. Say: "Historians ask questions and then look for sources that answer them. Today you are the historians." Show the question starter cards: **Who ...? Why ...? When ...? How ...? What happened to ...?**

✎ Main activity (25 min)

1. **Ask questions (8 min).** Groups look at all six sources and the timeline and write or say questions, one per sticky note (an adult scribes where needed). Ask for at least one question about a **person or group** (Mrs Hart, Mr Gale, Iris's family, the farmers).

2. **Sort and answer (10 min).** Read the 1948 notice aloud, stick the large copy on the timeline next to the 1948 card, and add the small copies to the groups' sources. Groups read their questions out; the class decides together where each goes on "Our questions". If the sources answer it, a child points to the source and says the answer. Likely questions and answers:

    - "What happened to Mr Gale?" (Answered: he became the school caretaker; Iris's memory.)
    - "When did Brook Farm get electricity?" (Answered: 1948; the notice and Iris's memory agree.)
    - "Who brought electricity to the farms?" (Answered: the Little Hill Farmers' Group, who borrowed money together, and the workers from Big Harbour who put up the poles; the notice.)
    - "Why did the farms wait so long?" (Partly answered: the poles and wires cost a lot, and the farmers had to borrow the money; the notice. Other reasons need another source.)
    - "How many lamps were on Main Street?" (Answered: twelve; the newspaper and the map.)
    - "Did houses in town have electric light in 1926?" (Need another source; none of ours says.)
    - "How did Mr Gale feel about his new job?" (Need another source.)

    For each "need another source" question, ask: "What kind of source might help?" (For example a photograph of a town house, a letter from Mr Gale, a memory from someone in town.) 3. **Then and now display (7 min).** Each child adds two things to the display, in their own way: one sentence or drawing comparing Iris and Leo ("In 1926 Iris ... Now Leo ..."), and one question about Little Hill's past with the kind of source that could answer it.

✓ Discussion questions (5 min, with answers)

1. "Who helped change things in Little Hill?" (Mrs Hart the mayor, the people who put in the lamps, the Farmers' Group, the workers from Big Harbour.) "What stayed the same?" (The school, the bridge, children playing hopscotch, Mr Gale working in Little Hill.)
2. "The 1948 notice and Iris's memory both say 1948. Does that make us more sure?" (Yes: two different sources agree.)
3. "Which question are you still wondering about?" (Any; there is no single answer.)

✓ Closing check (5 min, with answers)

Ask individual children: "Tell me one question about Little Hill in 1926. Which source could help answer it?" (Any sensible question and source.) Note answers; the full one-to-one check (see Assessment in the unit overview) is done during the week.

Vocabulary

question, historian, answer, source, group, change, stayed the same, agree, another source

Differentiation

- **Support:** ask one question using a starter card with an adult; place one event card from the small set on the timeline to show when it happened.
- **Stretch:** write a short memory as Mr Gale in 1948, then say what kind of source it is and when it was made. Or write a question that needs two sources to answer.
- **Tactile:** blind and low-vision children use the large-print or braille sources and the raised-line timeline; a partner writes their questions.

⚠ Safety

- Display only children's questions and comparisons about Iris and Leo, not family stories. If a child shares a family memory, thank them and do not write it down.

Teacher notes and misconceptions

- Some questions have no answer in any of our sources. That is normal in history; the honest answer is "our sources don't tell us".
- The Farmers' Group is like the real farmers' groups (co-operatives) that borrowed money to bring electricity to farms (see "Rural electrification" in the unit overview's Sources). The Little Hill group itself is made up.
- Keep the display up for term 3, when the year plan has a longer project comparing life then and now.

Grade 3 History, Geography and Society: Rules, Laws and Who Makes Them (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 12 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every activity against your school's rules.
>
> Text-checked by four other agents (Gemini 3.5 Flash, Gemini 4 Argon, Gemini 3.8 Flash and Gemini 4 Carbon); see Known gaps.

Back to the grade 3 year plan - Term 3. Builds on grade 1 society: Rules, fairness and community jobs, grade 2 society: People, jobs and choices, grade 3 society term 2: Then and now from sources, and the society progression

Big idea

Rules are made by people, for reasons: to keep people safe, to be fair, to look after places and things, and to help people get along. A law is a rule made by a government that everyone in a place has to follow. Different groups decide different things: a class, a school, a town council and a country's lawmakers. When a rule is not working, people can notice the problem, find out more, tell the people who decide, listen to everyone and change the rule, then check whether the change worked. Every choice has benefits (what you get) and costs (what you give up), and people who see a question differently often care about different things.

This is the third society unit of grade 3 (term 3). Grade 1 made and changed a rule for a class game and looked at rules in different places. Grade 2 met choosing when there is not enough, with a benefit and a cost. Grade 3 adds the difference between a rule and a law, four levels of decision-making (class, school, town, country), the steps a town uses to change a rule, weighing the benefits and costs of a choice, and a class meeting where children speak for made-up characters who see one question in different ways.

The town is the made-up Little Hill, used in earlier grades. Its mayor is Mayor Hen (the grade 3 literacy unit has children write letters to her). In 1926, in the term 2 society unit, the mayor was Mrs Hart: mayors change over time. The council, its meetings, the Pond Lane problem and the vote in this unit are made up. See Known gaps.

Outcomes

By the end of the unit most children can:

1. Say what a rule is for (safe, fair, looking after, getting along) and who made it (our class, our school, the town council or the country's lawmakers), and say that a law is a rule made by a government for everyone in a place.
2. Match a decision to the group that makes it (class, school, town, country), and name one job of Little Hill's town council and one job of a country's lawmakers.
3. Put the steps of changing a rule in order, using the Pond Lane story, and say what changed afterwards.

4. Name one benefit and one cost (what you give up) of a choice, and say which option they would choose and why.
5. Say why two made-up characters see the same question differently (what each one cares about).
6. Take part in a class meeting by listening, taking turns and giving a reason.

Prior knowledge

- Grade 1 society term 1: rules in different places with a "so that..." reason; three kinds of fair; changing a rule in a game that was not working.
- Grade 2 society term 1: there is not enough of everything, so people choose; a choice has a benefit and a cost.
- Grade 3 society term 2: Little Hill's past, including Mrs Hart, the mayor in 1926.
- Grade 3 literacy term 3: an opinion with reasons and "because"; letters to Mayor Hen. Lesson 5 uses this, but children can also give advice by speaking.
- An adult reads every card aloud. Children may follow the printed copy but do not need to read it alone.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week.

1. What rules are for and who made them: ten made-up rule cards from a class, a school, Little Hill and a country; sorting by what each rule is for and by who made it; a rule and a law; why the "dogs on leads by the pond" rule was made.
2. Who decides? Class, school, town and country: four circles one inside the other (class, school, town, country); eight decision cards; Little Hill's town council (Mayor Hen and five councillors); a country's lawmakers, and the three jobs of making laws, carrying them out and judging when people disagree about them; four ways of deciding (one person decides, a vote, taking turns, a meeting then a vote).
3. A problem on Pond Lane: how a rule changes: five story cards about cars going too fast past the park and the school; six step cards from "notice a problem" to "check it worked"; what changed for the town.
4. Benefits and costs: what do you give up?: three made-up choice cards (Mouse's Saturday, Goat's 10 Little Hill coins, Kit's Tuesday club); a benefits and costs chart; the town council's choice of one thing to pay for.
5. A class meeting about the park path: Mayor Hen asks the class for advice about bikes and scooters on the new park path; six role cards with different points of view; meeting rules; options, benefits and costs; a class letter of advice to Mayor Hen.

Materials (whole class unless noted)

- Ten rule cards, from the list in lesson 1, one large set for the class and one small set per pair (lessons 1, 2).
- Four "what it is for" cards (Keeps us safe, Is fair, Looks after places and things, Helps us get along and learn) and four "who made it" cards (Our class, Our school, Little Hill town council, The country's lawmakers), one large set and one small set per pair (lessons 1, 2).
- A large sheet with four circles one inside the other, labelled from the inside: Class, School, Town (Little Hill), Country, drawn by the teacher (lessons 2, 3, 5).

- Eight decision cards, from the list in lesson 2, one large set and one small set per pair (lesson 2).
- A Little Hill town council picture card (Mayor Hen and the five councillors, from the description in lesson 2) (lessons 2, 3, 4, 5).
- A small picture card of Mrs Hart, the mayor in 1926, from the term 2 society unit or drawn by the teacher (lesson 2).
- Five Pond Lane story cards, from the texts in lesson 3, one large set and one small set per pair (lesson 3).
- Six step cards, from the list in lesson 3, one large set and one small set per pair, and one long arrow drawn on a strip of paper for the board plus one arrow strip per pair (lesson 3).
- A large tally chart "Cars on Pond Lane in 10 minutes: before / after" (lesson 3).
- Three choice cards, from the texts in lesson 4, one set per pair, and a two-column "Benefits (what you get) / Costs (what you give up)" chart per pair, plus a large copy for the class (lessons 4, 5), and ten counters per pair needing support, standing for Goat's coins (lesson 4).
- A town choice card and three option cards (a new crossing, new library books, new park benches), from lesson 4 (lesson 4).
- Mayor Hen's letter to the class, from the text in lesson 5, and six role cards (Mouse, Goat, Duck, Ana, Sana and Remy), one large set and one small set per group of six, plus a role name badge for each child, drawn by the teacher or a child (lesson 5).
- A "Meeting rules" poster, made with the class in lesson 5, four option cards (A to D) for the park path, a talking object (for example a soft toy or a beanbag), and small blank voting cards (one per child) with a box, in case the class votes (lesson 5).
- A class post box (a shoebox with a slot) labelled "To Mayor Hen" (lesson 5).
- Blu-tack or masking tape (all lessons).
- Paper, sticky notes, pencils and crayons (all lessons).
- For blind or low-vision children: large-print or braille copies of every card and letter, a sorting mat with raised lines between the columns (lesson 1), a raised-line version of the four circles (string or puffy-paint rings) (lessons 2, 3, 5), a raised arrow and raised tally marks (lesson 3), a benefits and costs chart with a raised line between the columns (lessons 4, 5), and four voting cards marked A, B, C and D in raised or braille letters (lesson 5) (all lessons unless noted).

⚠ Safety and access

- **Keep it about Little Hill.** Never ask children what their families think about laws, the police, leaders, elections or political parties, who their family voted for, or whether anyone they know has been in trouble with the law. Every opinion in this unit belongs to a made-up character.
- **Stay neutral about real politics.** Do not name or discuss real political parties or current leaders, and keep your own views private. If a child raises a real news story, say "That's a real question people disagree about; in this unit we're practising on Little Hill," and move on gently.
- **Worries about the law.** Some children may have worries about the police, courts or rules at home. Keep the "judging" job in lesson 2 short and general, and let any child step out of a discussion.
- **The Pond Lane story is gentle on purpose.** Nobody is hurt; people find it hard and slow to cross. Do not add stories of accidents.
- **Speaking for a role.** In lesson 5 children speak for a made-up character, not for themselves. Make clear that a child playing Mouse does not have to agree with Mouse.

Ana uses a wheelchair; the child playing Ana does not act out using a wheelchair, and Ana's card is about what she wants from the path, like every other card.

- **Money is made up.** Goat's coins in lesson 4 are made-up Little Hill coins. Never ask about children's own pocket money or what their families can buy.
- **Votes are about Little Hill only.** If the class votes in lesson 5, it is advice about a made-up town's path. Never hold a class vote about a child's own life or views.
- Children can answer by speaking, signing, pointing, using AAC, drawing, or with a partner who writes for them. Their own way counts.
- Deaf children: show each card while it is read, face the class when reading aloud, and in the meeting make sure only one person speaks at a time (the talking object helps). Blind and low-vision children: use the raised-line circles and the large-print or braille copies listed in Materials; describe each picture card in words. Colour is never the only clue: the circles are labelled, and cards are sorted by place on the mat, not by colour.

Assessment

Watch and listen during lessons, and use the closing checks. During lesson 5 or the following week, see each child for about 4 minutes with the rule cards, the decision cards, the four circles, the step cards and one choice card (answers in brackets):

1. Show rule cards 1 ("Walk, don't run, in the corridor") and 6 ("Everyone in the country stops at a red traffic light"): "What is each rule for? Who made it? Which one is a law?" (1: keeps us safe, made by our school. 6: keeps us safe, made by the country's lawmakers; 6 is a law, because a government made it for everyone in the country.) (Outcome 1.)
2. Show decision cards 3 ("Where the new bench goes in Little Hill park") and 7 ("The rules for driving on every road in the country"): "Put each one in the right circle." "Tell me one job of the town council, and one job of the country's lawmakers." (3: town; 7: country. Council, for example: decides things for the town such as benches, crossings and fixing roads; holds meetings where people can speak. Lawmakers: make laws for the whole country, for example by talking about them and voting.) (Outcome 2.)
3. Give the six step cards, mixed up: "Put the steps in order. What changed on Pond Lane afterwards?" (Notice a problem; find out more; tell the people who decide; listen to everyone; decide; check it worked. A change, for example: there is a crossing; cars go slower at school times; fewer cars went fast in the second count.) (Outcome 3.)
4. Read choice card 2 (Goat's 10 coins): "Tell me one benefit and one cost of buying the kite. Which would you choose, and why?" (Benefit: Goat gets the kite to fly. Cost: Goat gives up the book and the ball, because the kite uses all 10 coins. Any choice with a reason counts.) (Outcome 4.)
5. Show the Mouse and Goat role cards from lesson 5: "Why do Mouse and Goat want different things for the path?" (Mouse cares about getting to school quickly by bike; Goat cares about walking safely without being bumped. Any answer about what each one cares about counts.) (Outcome 5.)
6. From watching lesson 5: did the child listen while others spoke, wait for a turn (or the talking object), and give at least one reason? (Outcome 6; a child who gives a reason by pointing, signing, AAC or through a partner gets "yes".)

Record "yes", "with help" or "not yet" for each outcome. A child who can do it in their own way (pointing, signing, AAC) gets "yes".

Sources

The C3 framework was read in the archived PDF (pages with the grades 3-5 civics and economics indicators): https://web.archive.org/web/20220403055307/https://www.socialstudies.org/sites/default/files/2017/Jun/c3-framework-for-social-studies-rev0617.pdf

The indicators used, quoted from the framework (the unit is not a full alignment):

- D2.Civ.1.3-5: "Distinguish the responsibilities and powers of government officials at various levels and branches of government and in different times and places." (Lesson 2.)
- D2.Civ.3.3-5: "Examine the origins and purposes of rules, laws, and key U.S. constitutional provisions." (Lesson 1; see Known gaps for the constitutional part.)
- D2.Civ.7.3-5: "Apply civic virtues and democratic principles in school settings." (Lesson 5, the class meeting.)
- D2.Civ.8.3-5: "Identify core civic virtues and democratic principles that guide government, society, and communities." (Lesson 5.)
- D2.Civ.9.3-5: "Use deliberative processes when making decisions or reaching judgments as a group." (Lesson 5.)
- D2.Civ.10.3-5: "Identify the beliefs, experiences, perspectives, and values that underlie their own and others' points of view about civic issues." (Lesson 5, using made-up characters' points of view.)
- D2.Civ.11.3-5: "Compare procedures for making decisions in a variety of settings, including classroom, school, government, and/or society." (Lessons 2, 3 and 5: the class meeting, the teacher deciding, the council's vote.)
- D2.Civ.12.3-5: "Explain how rules and laws change society and how people change rules and laws." (Lesson 3.)
- D2.Civ.13.3-5: "Explain how policies are developed to address public problems." (Lesson 3.)
- D2.Eco.1.3-5: "Compare the benefits and costs of individual choices." (Lesson 4.)

Background for the teacher, from Wikipedia articles read on 12 November 2026:

- "Law": https://en.wikipedia.org/wiki/Law ("a set of rules that are created and enforced by governmental or societal institutions to regulate behavior"; laws "can be made by a legislature", "by the executive" or "by judges' decisions"). Used for "a law is a rule made by a government" and the three jobs in lesson 2.
- "Legislature": https://en.wikipedia.org/wiki/Legislature ("a deliberative assembly that holds the legal authority to make law"; legislatures "may exist at different levels of governance"). Used for "the country's lawmakers" and for the town council as a smaller group that decides.
- "Mayor": https://en.wikipedia.org/wiki/Mayor ("Worldwide, there is a wide variance in local laws and customs regarding the powers and responsibilities of a mayor"; a mayor "may simply chair a multi-member governing body"). Used for Mayor Hen chairing the council.
- "Bill (law)": https://en.wikipedia.org/wiki/Bill_(law) ("a proposal for a new law, or a proposal to substantially alter an existing law"). Used for the teacher note on proposals in lesson 3; the word "bill" is not taught.
- "Opportunity cost": https://en.wikipedia.org/wiki/Opportunity_cost (the dictionary definition quoted there: "the loss of potential gain from other alternatives when one alternative is chosen"). Used for "a cost is what you give up" in lesson 4; the term "opportunity cost" is not taught.
- "Deliberation": https://en.wikipedia.org/wiki/Deliberation ("a process of thoughtfully exchanging and weighing options, for example prior to voting"; "Group decisions are

generally made after deliberation through a vote or consensus of those involved"). Used for the class meeting in lesson 5.

Known gaps and cautions

- Four other agents text-checked this unit on 2026-11-12: Gemini 3.5 Flash (at cc8185e) reported no errors; Gemini 4 Argon (at cc8185e and 6d872b2) reported one pronoun slip (Goat in lesson 4) and one materials note (an arrow strip for each pair in lesson 3), both fixed in 3edb47a and re-checked by Argon; Gemini 3.8 Flash (at 3edb47a) reported no errors; Gemini 4 Carbon (at 33e03b7) reported a yes/no voting card for a four-option vote (lesson 5) and pairs placing cards without their own circles sheet (lesson 2), both fixed in a5d4dd5 (with a leftover sentence tidied in 7c5f26f). Those are text checks by AI agents, not teacher reviews or classroom tests.
- Some Little Hill characters have different roles from the grade 2 unit People, jobs and choices (for example Remy runs the café here, and Duck is a mother duck). Tell the children the stories are separate.
- Little Hill, Mayor Hen, the council and its members, the Pond Lane problem, the car counts, the council vote and every character's point of view are made up by the author. Tell the children so.
- How towns and countries make decisions is different in different countries. In Little Hill the people choose five councillors in an election and the mayor chairs the meetings; real towns may have more or fewer councillors, and mayors may be chosen in other ways or have different powers (see the Wikipedia "Mayor" article). Tell the class what their own town and country call their decision-makers if your school wants to; the unit does not name any real government.
- D2.Civ.3.3-5 includes "key U.S. constitutional provisions". This unit does not teach any constitution. A teacher in the United States who needs that part should add it; teachers elsewhere may add their own country's founding rules, or leave it for later grades.
- D2.Civ.1.3-5 includes "branches of government". Lesson 2 only names three jobs (making laws, carrying them out, judging when people disagree about them) and does not name branches or institutions.
- D2.Eco.1.3-5 is about individual choices. Lesson 4 uses three made-up individual choices, then adds a town choice; the town choice is the author's extension, not part of that indicator.
- D2.Civ.8.3-5 names "civic virtues and democratic principles". The unit names only a few, in plain words (listening, taking turns, respect, fairness, everyone having a say); the list is the author's choice, not taken from the framework.
- The other grades 3-5 civics indicators (D2.Civ.2, D2.Civ.4, D2.Civ.5, D2.Civ.6 and D2.Civ.14) are not covered.
- The texts are read aloud. The unit does not use the grade 3 literacy letter sequence, because adults read the cards; it does not teach reading.
- The lesson order, the made-up stories, the card wording and the timings are the author's choices, not taken from a source.

Lesson 1: What rules are for and who made them

Unit overview - Next: Lesson 2

About 40 minutes.

Goal

Children sort ten made-up rules by what each rule is for and by who made it, learn that a law is a rule made by a government for everyone in a place, and work out why one Little Hill rule was first made.

Materials

- Ten rule cards (below), one large set for the class and one small set per pair.
- Four "what it is for" cards: Keeps us safe; Is fair; Looks after places and things; Helps us get along and learn. One large set and one small set per pair.
- Four "who made it" cards: Our class; Our school; Little Hill town council; The country's lawmakers. One large set and one small set per pair.
- Blu-tack or masking tape, and a board or wall space for two sorting rows.
- Paper and pencils for the closing check.
- For blind or low-vision children: large-print or braille copies of all the cards, and a sorting mat with raised lines between the columns.

The ten rule cards

Each card has a simple picture and the words, read aloud by an adult.

1. Walk, don't run, in the corridor. (Our school.)
2. Show the talking object before you speak in our class meeting. (Our class.)
3. Take turns on the playground swings: count to 50, then swap. (Our class.)
4. Wash your hands before lunch. (Our school.)
5. Dogs on leads by the Little Hill pond. (Little Hill town council.)
6. Everyone in the country stops at a red traffic light. (The country's lawmakers.)
7. Put litter in the bins in Little Hill park. (Little Hill town council.)
8. Market stalls in Little Hill square are packed away by six o'clock, so the street can be swept. (Little Hill town council.)
9. Children go to school. (The country's lawmakers; this is a law in many countries.)
10. Tidy the reading corner before home time. (Our class.)

Answer key, what each rule is mainly for: Keeps us safe: 1, 4, 5, 6 (card 4 keeps us healthy, which is a kind of safe). Is fair: 2, 3 (everyone gets a turn to speak or to swing). Looks after places and things: 7, 8, 10. Helps us get along and learn: 9. Many rules do more than one job: accept any answer with a sensible reason (for example 2 also helps us get along, and 5 also looks after the ducks).

Answer key, who made it: the brackets after each card. Laws: 6 and 9 (made by the country's lawmakers), and 5, 7 and 8 (made by the town council, which is also a kind of government). Rules 1, 2, 3, 4 and 10 are rules but not laws.

Steps

✎ Opening (5 min)

Ask: "What is a rule?" Take a few ideas. Say: "A rule tells people what to do or what not to do. Someone made every rule, for a reason. Today we are rule detectives: what is each rule for, and who made it?" Read rule card 1 aloud and ask: "Why do you think someone made this rule?" (So that nobody bumps into anyone or falls over.)

✎ Main activity (25 min)

1. **What is it for? (9 min).** Put the four "what it is for" cards in a row on the board. Read each rule card aloud and show the picture. Pairs put their small card under the purpose they think fits, then hold up their choice. Put the large card on the board, and ask a pair to give their "so that..." reason. If pairs disagree, say: "Many rules do more than one job. Which job is the biggest one?" Check with the answer key.
2. **Who made it? (8 min).** Put the four "who made it" cards in a second row. Ask: "Who do you think made this rule?" Pairs move their cards into the new row. Talk through clues: "Who could make a rule for every road in the country? Could our class make that rule?" (No: our class can only make rules for our class.)
3. **Rules and laws (3 min).** Point to the town council and country lawmakers cards. Say: "These groups are part of a government: they make decisions for everyone in a town or a whole country. A rule made by a government is called a law. Everyone in that place has to follow it, not only the people in one class or school." Ask: "Which of our cards are laws?" (5, 6, 7, 8, 9.) "Which are rules but not laws?" (1, 2, 3, 4, 10.)

4. **Where did this rule come from? (5 min).** Read this short story aloud:

   > Long ago there was no rule about dogs by the Little Hill pond. Every spring, Duck's ducklings hatched by the water. One spring, some dogs ran off their leads and chased the ducklings into the reeds. The ducklings were scared, and Duck was upset. People wrote to the town council. The council talked about it and made a new rule: "Dogs on leads by the pond." A sign went up by the water.

   Ask: "What problem came first?" (Dogs chased the ducklings.) "Who made the rule?" (The town council.) "What is it for?" (Keeping the ducklings safe; looking after the pond.) Say: "Most rules start with a problem that someone noticed."

✓ Discussion questions (5 min, with answers)

1. "Could our class make a rule that everyone in Little Hill must wear a hat?" (No: a class can only make rules for the class; a rule for the whole town would be made by the town council.)

2. "Why do you think the market has to be packed away by six o'clock?" (So that the street can be swept and cars and people can use it again; it looks after the town.)
3. "What might happen if there was no rule about red traffic lights?" (Cars might crash into each other or into people crossing; it would not be safe.)

✓ Closing check (5 min, with answers)

Read rule card 7 ("Put litter in the bins in Little Hill park"). Each child draws or writes two things on their paper: what it is for, and who made it. (Looks after places and things; Little Hill town council.) Then ask: "Is it a law?" Children show thumbs up for yes, thumbs down for no. (Yes: a government, the town council, made it for everyone in the park.)

Vocabulary

rule, law, government, town council, lawmakers, purpose ("what it is for")

Differentiation

- **Support:** give a pair only four rule cards (1, 3, 5, 6) and only the "what it is for" row. Say the "so that..." sentence starter for them to finish.
- **Stretch:** ask children to make up one new rule for the reading corner, say what it is for, and say who could make it (our class).
- **Tactile and non-speaking:** children place large or braille cards on a mat with raised lines between the columns, or point to the purpose card while a partner moves the rule card.

⚠ Safety

- Every rule is about the class, the school or made-up Little Hill. Do not ask what rules children have at home.
- The duckling story is gentle: the ducklings were scared but safe.

Teacher notes and misconceptions

- Children often think a law is "a big rule" or "a rule the police check". The unit's simple meaning is "a rule made by a government for everyone in a place". In this unit the town council counts as a government (a local government); that matches the Wikipedia "Legislature" article, which says law-making groups "may exist at different levels of governance".
- Some children think every rule was always there. The duckling story shows that a rule starts with a problem; lesson 3 shows a rule being changed.
- Whether the country or the town makes a rule (for example speed limits or school rules) differs between countries. The answer key follows the made-up Little Hill, not any real country.

Lesson 2: Who decides? Class, school, town and country

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 40 minutes.

Goal

Children match decisions to the group that makes them (class, school, town, country), learn who is on Little Hill's town council and what it does, hear the three jobs of a country's government, and compare different ways of deciding.

Materials

- The large sheet with four circles one inside the other, labelled from the inside: Class, School, Town (Little Hill), Country.
- Eight decision cards (below), one large set for the class and one small set per pair.
- The Little Hill town council picture card (described below).
- The ten rule cards and four "who made it" cards from lesson 1 (large set), for the opening.
- A small picture card of Mrs Hart, the mayor in 1926, from the term 2 society unit (or a drawing of a woman in 1920s clothes with the words "Mrs Hart, mayor in 1926").
- Blu-tack or masking tape.
- Paper and pencils for the closing check.
- For blind or low-vision children: a raised-line version of the four circles (string or puffy-paint rings) and large-print or braille decision cards.

The eight decision cards

1. Which game we play at class choosing time on Friday. (Class.)
2. What time school starts in the morning. (School.)
3. Where the new bench goes in Little Hill park. (Town.)
4. Which day the bins are emptied on Pond Lane. (Town.)
5. Which story is read at story time today. (Class.)
6. Which days each class uses the school hall. (School.)
7. The rules for driving on every road in the country. (Country.)
8. What the country's coins and notes look like. (Country.)

The Little Hill town council picture card

A drawing of a long table in the Little Hill town hall. Mayor Hen sits in the middle with a small bell for starting the meeting. Around the table sit the five councillors: Bear (who drives the Little Hill bus), Crab (who runs the hardware shop), Mrs Okafor (a retired teacher), Ted and Meg. A few chairs at the side say "Anyone may come and listen".

What the class is told (all made up for Little Hill): every four years the grown-ups of Little Hill choose the five councillors in an election. The council chooses Mayor Hen to lead its meetings. The council meets once a month; anyone may come, and at the start anyone may ask to speak. The council decides things for the whole town, such as parks, benches, crossings, bins, the library

and fixing roads, and it decides how to spend the town's money. When it cannot agree, the councillors vote, and the idea with the most votes wins.

Steps

✎ Opening (5 min)

Hold up the lesson 1 "who made it" cards. Ask: "Which group made the rule about dogs by the pond?" (The town council.) "Which group made the rule about red traffic lights?" (The country's lawmakers.) Say: "Today: who decides what? And how do they decide?" Show the four circles and ask: "Why is the class circle inside the school circle?" (Our class is part of the school; the school is part of the town; the town is part of the country.)

✎ Main activity (25 min)

1. **Which circle? (8 min).** Read each decision card aloud. Pairs agree which circle it belongs in and hold up their small card, pointing to that circle on the large sheet. Ask one pair for a reason, then have one child stick the large card in that circle. Check with the brackets above. Point out: "The bigger the circle, the more people the decision is for."

2. **Little Hill's town council (7 min).** Show the council picture card and read the description. Ask:

    - "Who chose the councillors?" (The grown-ups of Little Hill, in an election.)
    - "What does Mayor Hen do at the meeting?" (She leads it: she starts it, makes sure people take turns and keeps it moving.)
    - "Name one thing the council decides." (For example the bench, the bins, crossings, the library, mending roads, spending the town's money.)

    Show the Mrs Hart card. Say: "In 1926, in our then-and-now unit, the mayor of Little Hill was Mrs Hart. Now it is Mayor Hen. Mayors and councillors change over time, because new people are chosen." 3. **The country's three jobs (5 min).** Say: "A country has a much bigger government. It has three big jobs." Hold up three fingers, one at a time: - "**Making laws.** A big group of lawmakers, chosen by the grown-ups of the whole country in many countries, talks about new laws and votes on them." (Many countries call this group a parliament or a congress; tell the class what yours is called if your school wants to.) - "**Carrying out the laws.** A leader and their team make the laws happen, for example by building roads or running services." - "**Judging.** When people disagree about what a law means, or whether someone followed it, judges listen to both sides and decide."

    Ask: "Which job does the town council do when it makes the dog rule?" (Making a law, for the town.) 4. **How do they decide? (5 min).** Say: "Groups decide in different ways." Read these four ways and ask for each: "Is it quick? Does everyone get a say?" - The teacher decides alone which story to read (quick; the children do not get a say this time). - The class votes on Friday's game: hands up for each choice, and the one with the most hands wins (quite quick; everyone gets one vote, but some people may not get their choice). - The class takes turns: a different child chooses the game each Friday

(quick each time; fair over many weeks). - The town council listens to people at its meeting, talks, then votes (slow; many people get a say).

Say: "No way is best for every decision. Quick ways are good for small things; slower ways that listen to many people are used for bigger things that affect lots of people."

✓ Discussion questions (5 min, with answers)

1. "Could the town council decide what our class plays on Friday?" (No: that is a class decision. The council decides things for the whole town.)
2. "Why does the council let anyone come and speak at the start?" (So the people of the town can tell the council about problems and ideas before it decides; the decisions are for everyone in the town.)
3. "Why do you think the grown-ups of Little Hill choose new councillors every four years?" (So that if they want different people or different ideas, they can choose again; nobody stays in charge for ever without being chosen.)

✓ Closing check (5 min, with answers)

Read decision cards 4 and 8. Each child writes or draws the circle for each (4: town; 8: country) and one thing the town council decides (for example benches, bins, crossings). Children who are not writing point to the circles on the sheet and tell an adult.

Vocabulary

decide, decision, town council, councillor, mayor, election, vote, lawmakers, judge

Differentiation

- **Support:** use only the class, town and country circles and four cards (1, 3, 7, 8). Ask "Is it for our class, our town or our whole country?"
- **Stretch:** ask children to make up a ninth decision card and say which circle it belongs in and why.
- **Tactile and non-speaking:** children place braille or large cards inside the raised rings, or point to a ring while a partner places the card.

⚠ Safety

- Do not name or discuss real political parties, current leaders or real elections, and do not ask who children's families voted for.
- Keep the judging job short and general. If a child mentions someone they know and the police or a court, thank them kindly and move on; follow your school's guidance if you are worried.

Teacher notes and misconceptions

- Children often think the mayor, or a single leader, decides everything. In Little Hill Mayor Hen leads the meetings, but the council decides together. Real mayors differ a great deal: the Wikipedia "Mayor" article says a mayor "may simply chair a multi-member governing body" in some places and leads the town's government in others.
- Who decides school start times, bin days or driving rules differs between countries and places. The answers follow made-up Little Hill and are a simple model, not a description of any real country.
- The circles are a simplification: many countries also have regions, states or provinces between the town and the country. Mention this if children know about it; the unit does not teach it.
- The three jobs are given in plain words. The unit does not name the branches of government; see Known gaps in the unit overview.

Lesson 3: A problem on Pond Lane: how a rule changes

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 40 minutes.

Goal

Children follow a made-up story of a town problem, put the six steps of changing a rule in order, and say what changed for the people of Little Hill afterwards, including who gained and who gave something up.

Materials

- Five Pond Lane story cards (below), one large set for the class and one small set per pair.
- Six step cards (below), one large set and one small set per pair.
- One long arrow drawn on a strip of paper for the board, and one arrow strip per pair, for laying the step cards along.
- A large tally chart: "Cars on Pond Lane in 10 minutes", with two rows, "Before" and "After", and two columns, "All cars" and "Going too fast".
- The Little Hill town council picture card and the four circles sheet from lesson 2.
- Blu-tack or masking tape.
- Paper and pencils for the closing check.
- For blind or low-vision children: large-print or braille story and step cards, a raised arrow (a ridge of tape or string) to lay the step cards along, and a tally chart with raised tally marks (pipe-cleaner or puffy paint).

The five Pond Lane story cards

Read each card aloud. Each has a simple picture.

1. **The problem.** Pond Lane runs between Little Hill park and Little Hill School. Cars and vans often drive fast along it. In the morning, children walking to school and people going to the park have to wait a long time to cross, and Duck has to hurry her ducklings across to the pond. Nobody has been hurt, but many people feel worried.
2. **Finding out more.** Goat and Mouse want to know if the problem is real. With their teacher, they stand behind the park fence on a school morning for 10 minutes. They count 23 cars. The town's speed sign, which flashes when a car is too fast, flashes for 15 of them.
3. **Telling the people who decide.** Goat and Mouse write a letter to Mayor Hen with their tally chart. At the next town council meeting, Mouse asks to speak at the start. She shows the chart and says, "Please can Pond Lane be safer to cross?"
4. **Listening to everyone.** Mayor Hen asks other people to speak. Duck says, "I want a safe place for my ducklings to cross." Bear, a councillor who drives the bus, says, "If cars must go slower all day, my bus will be late." Crab, who runs the hardware shop, says, "Vans must still be able to bring things to my shop." Mrs Okafor says, "Children and older people should be able to cross without hurrying." The council lists four ideas: A, a crossing with stripes and a crossing helper at school times; B, a slow speed on Pond Lane at school times only; C, close Pond Lane to cars; D, change nothing.

5. **Deciding and checking.** The council talks about every idea. Closing the lane (C) would stop the bus and the vans, and changing nothing (D) would not help. The five councillors vote on A and B together. Four vote yes and Bear votes no, because he still worries about the bus. The new rule is: "A crossing with a helper, and slow speed on Pond Lane at school times." A month later Goat and Mouse count again: 22 cars, and the sign flashes for 3 of them. The bus is a little slower at school times. The council says it will look at the rule again next year.

The six step cards

Notice a problem. Find out more. Tell the people who decide. Listen to everyone. Decide. Check it worked.

Answer key: the order is as listed. Story card 1 is "Notice a problem", 2 "Find out more", 3 "Tell the people who decide", 4 "Listen to everyone", and 5 shows both "Decide" and "Check it worked".

Steps

✎ Opening (5 min)

Show the four circles. Ask: "Who would decide about a busy road in Little Hill: the class, the school, the town or the country?" (The town council.) Say: "Today we find out how the people of Little Hill changed a rule about a road. Listen for what happens first, next and last."

✎ Main activity (25 min)

1. **Hear the story (7 min).** Read the five story cards aloud, showing each picture. Fill in the "Before" row of the tally chart together after card 2 (23 cars, 15 too fast), and the "After" row after card 5 (22 cars, 3 too fast). Ask after card 4: "Why do Bear and Duck want different things?" (Bear cares about the bus being on time; Duck cares about her ducklings crossing safely.)
2. **Put the story in order (5 min).** Pairs mix up their small story cards, then put them back in order without looking at the numbers (cover the numbers with tape or cut them off before the lesson).
3. **The six steps (8 min).** Put the long arrow on the board and give each pair an arrow strip. Read the six step cards. Pairs lay their step cards along their arrow in order, then put each story card under the step it shows. Check with the answer key and build the large version on the board.
4. **What changed? (5 min).** Ask:
    - "What changed on Pond Lane?" (There is a crossing with a helper; cars go slower at school times; far fewer cars went too fast: 3 instead of 15.)
    - "Who is better off?" (Children, older people, Duck and her ducklings, people going to the park.)
    - "Who gave something up?" (The bus is a little slower at school times; drivers must slow down.)

Say: "When a rule changes, life in the town changes too. Usually some people gain more than others, so the council listened to everyone and will check again next year."

✓ Discussion questions (5 min, with answers)

1. "Why did Goat and Mouse count the cars before writing to Mayor Hen?" (To find out if the problem was real, and to show the council facts, not only a feeling.)
2. "Bear voted no. Does he have to follow the new rule?" (Yes: the council decided by voting, and the new rule is for everyone, even people who voted no. Bear can ask the council to look again next year.)
3. "Why didn't the council close Pond Lane?" (It would stop the bus and the vans: the cost was too big for some people.)

✓ Closing check (5 min, with answers)

Say: "Our class has a problem: the reading corner is messy every afternoon, even though we have a rule to tidy it." Each child draws or writes the first two steps the class could take, using the step cards on the board. (Notice a problem: the corner is messy. Find out more: for example look at the corner each afternoon for a week, or ask who uses it and when.) Children who are not writing point to the two step cards and tell an adult their idea.

Vocabulary

problem, change, council meeting, vote, new rule, check

Differentiation

- **Support:** use only four step cards (Notice a problem, Tell the people who decide, Decide, Check it worked) and story cards 1, 3 and 5.
- **Stretch:** ask children which other idea (A, B, C or D) they would have chosen as a councillor, and one cost of that idea. Say it is a made-up town: any reasoned answer is fine.
- **Tactile and non-speaking:** children lay braille or large step cards along a raised arrow (a ridge of tape or string), and point to the tally marks to compare before and after.

⚠ Safety

- The story is gentle on purpose: nobody is hurt. Do not add stories of real road accidents.
- Goat and Mouse count cars with their teacher, behind a fence. If the class wants to do a real traffic count, follow your school's rules for trips; children never stand at the roadside. The unit does not need a real count.

Teacher notes and misconceptions

- Children often think rules are made once and never change. The story shows a rule being proposed, discussed, voted on, tried and planned for review. A proposal for a new

or changed law is called a bill in many places (the Wikipedia "Bill (law)" article: "a proposal for a new law, or a proposal to substantially alter an existing law"); the unit does not teach that word.
- Some children think the side that loses a vote does not have to follow the rule. Discussion question 2 addresses this.
- The numbers, the flashing sign, the vote and the new rule are made up. Real towns use many ways to make roads safer, and what a town council is allowed to decide about roads differs between countries.

Lesson 4: Benefits and costs: what do you give up?

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 40 minutes.

Goal

Children list the benefits (what you get) and costs (what you give up) of each option in three made-up choices, say which option they would choose and why, and then weigh a choice the town council has to make.

Materials

- Three choice cards (below), one set per pair.
- A two-column chart per pair: "Benefits (what you get)" and "Costs (what you give up)", with a line across the middle so each option has its own half.
- A large copy of the same chart for the class.
- The town choice card and its three option cards (below), large, for the class.
- The Little Hill town council picture card from lesson 2.
- Blu-tack or masking tape.
- Paper, sticky notes and pencils.
- Ten counters per pair needing support, standing for Goat's coins.
- For blind or low-vision children: large-print or braille choice cards and a chart with a raised line between the columns and across the middle.

The three choice cards

1. **Mouse's Saturday morning.** The Pond Lane fair is on Saturday morning, with games and a toy duck race on the pond. It only happens once a year. Mouse also planned to finish her model boat with Goat that morning, so they can sail it on Sunday. She cannot do both.
2. **Goat's 10 coins.** Goat has 10 Little Hill coins (made-up money). A kite costs 10 coins. A book costs 6 coins and a ball costs 4 coins. Goat can buy the kite, or the book and the ball.
3. **Kit's Tuesday club.** Football club and choir both meet on Tuesday after school. Kit can only go to one. The choir is singing in a concert at the end of term.

Answer key (examples; accept any sensible answer):

- Mouse, fair: benefit, games and the duck race with friends, and it only happens once a year; cost, the boat is not finished, so no sailing on Sunday, and Goat finishes it alone or waits. Mouse, boat: benefit, the boat is finished and they can sail it on Sunday; cost, she misses the fair until next year.
- Goat, kite: benefit, a kite to fly; cost, no book and no ball (all 10 coins are used). Goat, book and ball: benefit, two things, a story to read and a ball to play with; cost, no kite. (6 + 4 = 10, so both use all the coins.)
- Kit, football: benefit, playing a game and running about with the team; cost, no choir and no singing in the concert. Kit, choir: benefit, singing and being in the concert; cost, missing football on Tuesdays.

The town choice card and options

Read aloud: "Little Hill town council has enough money for **one** new thing this year. The councillors must choose."

- **Option 1:** a second crossing, on Station Road.
- **Option 2:** new books for the Little Hill library.
- **Option 3:** new benches in Little Hill park.

Steps

✎ Opening (5 min)

Remind the class of lesson 3: "When the council made the Pond Lane crossing, who gained, and who gave something up?" (Children, older people and Duck gained; the bus is a little slower.) Say: "Every choice is like that. A **benefit** is what you get. A **cost** is what you give up. Sometimes a cost is money, and sometimes it is time, or another thing you could have had."

✎ Main activity (25 min)

1. **One together (4 min).** Read choice card 1 (Mouse). Fill in the class chart together: the fair in the top half, the boat in the bottom half, benefits on the left, costs on the right. Point out: "The cost of going to the fair is the boat; the cost of the boat is the fair. You give up the one you don't choose."
2. **Pairs (12 min).** Pairs take choice cards 2 and 3 and fill in their own chart for each, drawing or writing on sticky notes. Go round and ask: "What does Goat give up if he buys the kite?" (The book and the ball.) Children who finish early add one more benefit or cost to Mouse's card.
3. **What would you choose? (4 min).** Each child picks one card and tells their partner, using this sentence: "I would choose ___ because ___, even though I give up ___." Ask three children to share. Say: "Different people can make different choices, because they care about different things. Both can be good choices."
4. **The town's choice (5 min).** Read the town choice card and the three options. For each, ask: "Who would this help?" and "If the council chooses this, what does the town give up?" (Crossing: helps people crossing near the station; gives up the books and benches this year. Books: helps readers and the school; gives up the crossing and benches. Benches: helps people who need to rest in the park, for example older people; gives up the crossing and the books.) Pairs agree which they would choose and give one reason. Do not count a class vote: there is no right answer.

✓ Discussion questions (5 min, with answers)

1. "Goat buys the kite. Did it cost him anything apart from the coins?" (Yes: it cost him the book and the ball he could have bought instead.)
2. "Why might two children make different choices on Kit's card?" (They care about different things: one may love football, another may love singing.)

3. "Why can't the council buy all three things?" (There is only enough money for one; there is never enough of everything, so people have to choose.)

✓ Closing check (5 min, with answers)

Read: "Remy has one ticket at the Pond Lane fair. Remy can ride the little train or have a go at the hook-a-duck game." Each child draws or writes one benefit and one cost of riding the train. (Benefit, for example: a ride round the park. Cost: no go at the hook-a-duck game.) Children who are not writing tell an adult or point to pictures.

Vocabulary

choice, option, benefit, cost, give up

Differentiation

- **Support:** use only choice card 2 with real counters standing for the coins (10 counters; the kite takes all 10; the book takes 6 and the ball 4). Ask: "What is left after the kite?" (Nothing.)
- **Stretch:** ask children to add a fourth town option and say who it would help and what the town would give up.
- **Tactile and non-speaking:** counters for the coins; children place braille or picture cards in the raised chart, or point to "benefit" or "cost" while a partner places the card.

⚠ Safety

- The coins are made-up Little Hill coins. Never ask about children's own money, pocket money or what their families buy.
- The clubs and the fair belong to made-up characters. Do not ask which clubs children go to or what their families do at weekends.

Teacher notes and misconceptions

- Many children think a cost is only money. The unit's meaning, "what you give up", follows the idea of opportunity cost (the Wikipedia "Opportunity cost" article quotes "the loss of potential gain from other alternatives when one alternative is chosen"); the term itself is not taught.
- The town choice goes beyond the C3 indicator used here, which is about individual choices; see Known gaps in the unit overview.
- Some children decide a choice is "wrong" because it has a cost. Stress that every option has costs; a good choice is one where you have thought about them.

Lesson 5: A class meeting about the park path

Unit overview - Previous: Lesson 4

About 40 minutes.

Goal

Children hold a class meeting about a made-up Little Hill question, speaking for characters who see it differently, follow meeting rules they agree together, weigh the options, and send advice with reasons to Mayor Hen.

Materials

- Mayor Hen's letter (below), large.
- Six role cards (below), one large set for the class and one small set per group of six.
- A role name badge for each child (a sticky note with the character's name and picture, drawn by the teacher or a child).
- A large sheet for the "Meeting rules" poster, made with the class.
- A talking object (for example a soft toy or a beanbag) for the meeting.
- Four option cards, A to D (below), large.
- The two-column benefits and costs chart from lesson 4 (large copy, wiped or a new sheet).
- Small blank voting cards (one per child) and a box, in case the class votes.
- The class post box labelled "To Mayor Hen".
- Paper and pencils.
- The four circles sheet and the council picture card from lesson 2.
- For blind or low-vision children: large-print or braille copies of the letter, the role cards and the option cards, and a raised-line chart; four voting cards marked A, B, C and D in raised or braille letters, so the child can choose one by touch and put it in the box.

Mayor Hen's letter

> Dear class,
>
> Little Hill park has a new smooth path round the pond. Some people want bikes and scooters to be allowed on it. Some people do not. The town council will decide at next month's meeting. Please hold a class meeting, listen to everyone, and send us your advice, with your reasons.
>
> From Mayor Hen

The six role cards

1. **Mouse** rides her bike to school through the park. On the path she is away from cars and gets to school quickly. She cares about getting there quickly and safely.
2. **Goat** walks slowly with a walking stick. He worries that bikes will come up fast behind him and bump him. He cares about walking safely.

3. **Duck** takes her ducklings across the path to the pond every morning. She worries about fast wheels. She cares about the ducklings being safe.
4. **Ana** uses a wheelchair. She likes the smooth path, because the grass is bumpy. She does not mind bikes if they go slowly, but she needs room to get past. She cares about having space on a smooth path.
5. **Sana** scoots to the park to meet friends. There is nowhere else smooth to scoot. She cares about having somewhere to play.
6. **Remy** runs the café beside the path, with tables near the edge. Remy wants the path calm for people at the tables, but also likes more visitors coming by. Remy cares about the café being safe and busy.

The four option cards

- **A:** Bikes and scooters can go anywhere on the path, at any speed.
- **B:** No bikes or scooters on the path.
- **C:** Bikes and scooters are allowed, but they go slowly, ring a bell, and let walkers go first.
- **D:** A painted line down the middle: bikes and scooters on one side, walkers and wheelchairs on the other.

Steps

✎ Opening (5 min)

Read Mayor Hen's letter aloud. Ask: "Who decides about the park path?" (The town council.) "What is the council asking us to do?" (Hold a meeting, listen to everyone and send advice with reasons.) Say: "Today we are going to speak for six people of Little Hill. You do not have to agree with your character: you are helping them be heard."

✎ Main activity (25 min)

1. **Meeting rules (4 min).** Ask: "What makes a good meeting, where everyone is heard?" Write the class's ideas on the poster. Make sure it includes: only the person with the talking object speaks; listen while others speak; give a reason; disagree with the idea, not the person; everyone gets a say. Say: "These are the same ideas grown-up meetings and governments try to follow: fairness, respect, and everyone having a say."
2. **Get to know your character (6 min).** Put children in groups of six and give each child a role and a badge. An adult reads each role card aloud to the group. Each child practises one sentence with the group: "I am ___. I care about ___, so I think ___."
3. **The meeting (6 min).** Sit in a circle. The teacher chairs, like Mayor Hen. Ask one child for each of the six roles to speak, passing the talking object. Then ask: "Did anyone hear a reason that changed their mind?"
4. **Weighing the options (5 min).** Show option cards A to D. For each, ask: "Which characters would this help? Who would give something up?" Write short answers on the chart. (Examples: A helps Mouse and Sana but worries Goat, Duck and Ana. B helps Goat and Duck but Mouse is back on the road with cars and Sana has nowhere to scoot. C helps most people a little; riders give up some speed. D gives everyone a side, but the path may be too narrow for Ana to get past, and the ducklings must cross the bike side.)

5. **Try to agree (4 min).** Ask: "Is there an option most of us think is fair to most characters?" If the class agrees, that is the advice. If not, each child writes or draws A, B, C or D on a blank voting card and puts it in the box face down; two children count the cards with the teacher. Say: "This is a vote about a made-up town's path, to give Mayor Hen advice. The council still decides."

✓ Discussion questions (5 min, with answers)

1. "Why did Goat and Mouse want different things?" (Mouse cares about getting to school quickly and away from cars; Goat cares about walking safely without being bumped.)
2. "Which meeting rule helped most today, and why?" (Any rule with a reason; for example the talking object meant one person spoke at a time, so everyone could hear.)
3. "Is a vote the only way to decide?" (No: the class could also agree all together, or Mayor Hen could decide. Talking first helps people choose better, whichever way is used.)

✓ Closing check (5 min, with answers)

Each child writes or draws one sentence of advice for Mayor Hen: "We think ___ because ___." (Any option with a reason that refers to at least one character, for example "We think C because Ana and Goat can still use the path safely and Mouse can still ride.") Children who are not writing tell an adult, who writes their words, or choose an option card and point to a character. Read out a few, then put them all in the class post box. After the lesson the teacher writes a short class letter with the advice and the reasons, and posts it too.

Vocabulary

meeting, chair, point of view, advice, agree, disagree, option, vote

Differentiation

- **Support:** give a child a role with a sentence already started on the badge ("I am Duck. I care about my ducklings, so I think ___."). Pair them with a partner who has the same role.
- **Stretch:** after the meeting, ask children to write a second sentence from a character who would not like the class's advice, and suggest one change that might help that character.
- **Tactile and non-speaking:** children speak for their character by pointing to an option card, using AAC, signing, or through a partner; the talking object passes to them like everyone else.

⚠ Safety

- Children speak for made-up characters, not for themselves. Never ask what children's own families think about bikes, parks or rules, and never hold a class vote about a child's own life or views.
- Ana uses a wheelchair. The child playing Ana does not act out using a wheelchair: Ana's card is about what she wants from the path, like every other card. If a child in the class uses a wheelchair, do not ask them to speak for Ana unless they choose to.

- Any child can pass the talking object without speaking.

Teacher notes and misconceptions

- Deliberation means "thoughtfully exchanging and weighing options, for example prior to voting" (Wikipedia "Deliberation"). The meeting is designed so that children talk and weigh options before any vote, and so that agreeing all together is tried first.
- Children often think the side with the most votes is "right". Stress that a vote is a fair way to decide when people still disagree, not a way to find out who is right, and that the council still decides.
- Mayor Hen's reply is optional. If you write one, keep it made up and short (for example thanking the class and saying the council read their reasons), and do not promise that the council chose the class's option.

From claim to conclusion: checking information

Subject: History, geography and society Grade: 8 Lessons: 5 Time per lesson: about 55–60 minutes

Status: written (unreviewed AI draft; not human-educator-reviewed or classroom-tested)

Author: GPT-5.6 Sol

Big idea

A careful conclusion connects a precise claim to relevant evidence whose origin, date, context and independence have been checked. Good investigators also say what remains uncertain and what new evidence could change their conclusion.

What students should be able to do

- Distinguish a claim, a piece of evidence and an inference, and test whether evidence supports the precise claim made.
- Trace information toward its original source while separating source type, firsthand access, expertise and reliability.
- Check event, observation, publication and update dates and restore missing quotation or image context.
- Corroborate across genuinely independent sources and detect several reports that all repeat one source.
- Communicate a calibrated conclusion—supported, contradicted or not enough information—and name evidence that could change it.

What students should already know

Students should be able to summarize a short paragraph, compare two statements and explain a reason in a complete sentence. No live-web research skill is assumed.

Use this short diagnostic as a conversation, not an admission gate:

1. “The path is wet” is written in a note. Is that sentence a claim, evidence, or both?
2. Two posts repeat the same sentence. Must that mean two people checked it?
3. What is one question to ask before sharing an old photograph as current?

Diagnostic guide: (1) It is a claim in the note; the note itself can also be evidence that someone made that claim. It is not automatically proof that the path was wet. (2) No; both may copy one source. (3) Ask when the scene was observed or photographed, not only when a repost was published. Accept equivalent questions. Revisit these distinctions during the unit rather than excluding students.

Lesson list

1. Claim, evidence, inference: separate the three roles and test relevance to a precise claim.

2. Follow the information trail: trace provenance and ask what a source could directly know.
3. Date and context: distinguish four kinds of time and restore cropped context.
4. Independent corroboration: compare sources without double-counting copies.
5. A conclusion with room to change: synthesize an evidence packet and complete an eight-task assessment.

Materials (whole unit)

Printed or digital copies of the fictional source cards in each lesson, paper or note-taking device, highlighters or tactile markers, and a board. All cards are included as plain text. Offer large print, screen-reader-compatible text and oral response. No live internet, account, purchase, personal data or image file is required.

Assessment

Lesson 5 contains a compact fictional evidence packet, eight checkable tasks and a worked guide. Students may respond in writing, orally or with a structured table; do not score speed, handwriting or accent. Judge each claim-evidence connection separately. There is no validated pass threshold, and this short assessment does not measure all information-literacy skills.

Sources

Consulted November 4, 2026:

- Civic Online Reasoning, Digital Inquiry Group (formerly Stanford History Education Group) informed the emphasis on leaving an unfamiliar page to investigate its source and compare independent coverage. This is a pedagogical influence, not a claim of alignment or endorsement.
- Library of Congress primary-source analysis guides informed the observe–reflect–question pattern and attention to what a source shows versus what a reader infers.
- UNESCO Media and Information Literate Citizens curriculum informed the broader emphasis on evaluating, using and communicating information responsibly.

All fictional cards, cases, questions and explanations in this unit are original CC0 material. Linked works remain under their own terms.

Known gaps and cautions

Pacing and reading load are untested. A qualified local educator should check language, accessibility, cultural context and curriculum requirements before classroom use. Agent peer review is not human educator review.

The unit uses prepared text rather than a changing live web, does not cover advanced verification such as geolocation or forensic media analysis, and cannot make students immune to deception. It deliberately avoids classifying whole sources as simply “good” or “bad”: reliability depends on the particular claim, method and context. Credentials, source type, domain name, polish, popularity, search rank, screenshots and repetition are clues, not automatic proof. Safety examples avoid real-person accusations and political persuasion; teachers should not substitute sensitive local rumors without appropriate safeguards.

Lesson 1: Claim, evidence, inference

Time: about 55–60 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: GPT-5.6 Sol.

Goal

Distinguish claims, evidence and inferences, then decide whether evidence supports the precise claim being evaluated.

Materials

Lesson cards below, paper or note-taking device, and optional three-column organizer labelled Claim / Evidence / Inference.

Steps

✎ 1. Opening — 7 minutes

Display: “The courtyard fountain was running at 08:10.” Ask students to underline what would need checking. Then add: “Amina wrote at 08:12, ‘I heard splashing through the library window.’” Ask: What does the message support directly, and what still requires an inference?

2. Build the distinctions — 10 minutes

Use these working definitions:

- A **claim** is a statement that could be accepted, rejected or left uncertain.
- **Evidence** is information used to evaluate a claim. Evidence can be strong for one claim and weak for another.
- An **inference** is a reasoned step from evidence toward a conclusion.

The message is direct evidence that Amina reported hearing splashing. Inferring that the fountain caused it is plausible, but a sprinkler, rain or another source could also explain the sound. A message can be evidence that a person made a claim without proving that the claim is true.

3. Card sort — 15 minutes

Read the fictional case:

Claim C: “The north greenhouse exceeded 30°C before noon on Tuesday.”

- **Card A:** A calibrated thermometer log says “North greenhouse, Tuesday, 11:40, 32°C.” The custodian signed the entry at 11:41.
- **Card B:** A student says on Wednesday, “The greenhouse always feels hot.”
- **Card C:** The south greenhouse log says “Tuesday, 11:40, 32°C.”
- **Card D:** A Tuesday photograph shows condensation on the north greenhouse windows; no clock or thermometer is visible.

- **Card E:** The north greenhouse door was open at 12:20 Tuesday.

For each card, students choose: relevant direct support, relevant but indirect, irrelevant to this precise claim, or potentially contradictory. They must complete: “This card shows ___; to reach the claim, I would also have to assume ___.”

4. Discussion — 8 minutes

Ask:

1. Which card most directly supports Claim C? **Example good answer:** A, because it names the correct place, date, time and measurement; calibration and record integrity could still be checked.
2. Why is Card C not support? **Example:** It measures the wrong greenhouse.
3. Does Card D prove the temperature exceeded 30°C? **Example:** No. Condensation has multiple possible causes and supplies no temperature or time.
4. Can one item play more than one role? **Example:** Yes. The log entry is evidence in our investigation and contains a claim about a measurement.

✎ 5. Independent practice — 12 minutes

Evaluate: **Claim D:** “The community garden received no visitors between 14:00 and 15:00.”

- Gate counter recorded zero badge entries in that hour.
- A sign says the garden also has an unmonitored side gate.
- A camera covering both gates operated continuously and shows nobody entering or leaving; it does not show the whole garden.
- A volunteer saw no one near the tool shed at 14:30.

Students label each item and write a calibrated conclusion. Emphasize that **absence of evidence** (no badge entries in an incomplete system) is not automatically **evidence of absence**. A continuous camera covering every entrance would be evidence of no entry, but still would not prove nobody was already inside.

✓ 6. Closing check — 5 minutes

1. “Three people reposted the same weather claim.” Is the number of reposts evidence that three checks occurred?
2. Name one missing fact that would make Card A stronger.

Answer guide

- Opening: The report directly supports “Amina reported hearing splashing around 08:10.” Fountain operation is an inference needing another check.
- Card sort: A = relevant direct support; B = weak/indirect and vague; C = irrelevant to the north greenhouse; D = indirect and insufficient; E = not evidence for the before-noon temperature.
- Claim D: badge data alone is incomplete; tool-shed observation covers one place and time; the camera strengthens “no one entered or left,” but none proves no visitor was already

inside. Best conclusion: not enough information for “no visitors.” A full-site continuous record or start/end sweep could change it.
- Closing 1: No; the posts may repeat one source. 2: Examples include thermometer calibration, whether “32°C” was read correctly, or whether the entry was made at the stated time.

Vocabulary

- **Claim:** a checkable statement.
- **Evidence:** information used to evaluate a claim.
- **Inference:** a reasoned step beyond what is directly observed.
- **Relevant:** bearing on the precise claim being tested.

Differentiation

- **Extra support:** color-code who/what, place and time in both claim and card; allow oral sorting with physical labels.
- **Extra challenge:** rewrite Claim C into a narrower claim supported directly by Card A, then list two ways the record could still be mistaken.

⚠ Safety

Cases are fictional. Do not replace them with accusations about classmates or ask students to disclose private messages, location histories or personal accounts.

Teacher notes

“Evidence” does not mean “proof,” and “inference” does not mean “bad guess.” Ask whether the reasoning is warranted and what alternatives remain. A polished document, confident tone or screenshot can still contain an unsupported claim.

Unit overview · Next lesson

Lesson 2: Follow the information trail

Time: about 55–60 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: GPT-5.6 Sol.

Goal

Trace a statement toward its original source and separate source type, access, expertise and reliability for a particular claim.

Materials

Source-chain cards below and a four-column organizer: Source / Obtained from / Could directly know / Remaining question.

Steps

✎ 1. Opening — 6 minutes

Display: “A highly ranked result with a professional logo says the bridge opened in 1924.” Ask students for clues they notice, then ask which clue actually establishes the opening year. Explain that rank, design, URL ending, popularity and confident wording may guide questions but do not settle the claim.

2. Provenance model — 10 minutes

Define **provenance** as the path showing where information came from and how it changed. Model the difference between:

- source type: diary, database, news report, summary, repost;
- firsthand access: whether the source observed or created the relevant record;
- expertise: knowledge or method relevant to interpreting it;
- reliability for this claim: the final judgment after checking the above.

A firsthand witness may misremember. An expert may rely on incomplete data. A later summary may accurately quote an original. Do not label a whole source “good” or “bad.”

3. Trace the chain — 18 minutes

All cards are fictional:

- **Card 1 — QuickFacts page, updated 2026:** “Silver Span opened in 1924,” followed by “Source: City Heritage Bulletin.”
- **Card 2 — City Heritage Bulletin, 2008:** “The bridge opened in 1924, according to historian L. Chen’s booklet River Crossings.”
- **Card 3 — River Crossings, 1986:** “A ceremony took place in 1924,” citing Archive Folder B-17.

- **Card 4 — Folder B-17:** invitation dated 3 May 1924: “Join us for the ceremonial laying of the final stone.”
- **Card 5 — Transport ledger:** first toll collected 18 November 1925.

Students draw arrows showing who cites whom. Ask which card is closest to the 1924 event, and whether it supports “opened.”

Example good answer: Card 4 is contemporaneous but describes a construction ceremony, not opening to traffic. Card 5 directly records operational use in 1925. The chain appears to have changed “final stone ceremony” into “opened.”

4. Source capability questions — 8 minutes

For Cards 4 and 5 ask:

1. What could the creator directly know?
2. Why was it created?
3. What claim does it not settle?

Example answers: The invitation establishes an announced ceremony and date, not that it occurred or that traffic began. The ledger records a toll entry and operational context, but it may not identify the first untolled crossing.

✎ 5. Independent practice — 12 minutes

Trace this second chain:

- A class poster says a pond has 14 frog species.
- Its footnote links to a newsletter saying “up to 14 amphibian species were reported.”
- The newsletter summarizes a survey table listing 9 frog species, 3 salamanders and 2 newt species.

Students identify two transformations and rewrite the narrowest supported claim.

✓ 6. Closing check — 5 minutes

1. Is an original source automatically accurate?
2. Why might opening a cited source change a conclusion?

Answer guide

- Bridge: The 1924 opening claim is not supported by the cited chain. Card 4 supports an invitation to a final-stone ceremony; Card 5 supports at least one toll collection in 1925. Exact public-opening date remains uncertain.
- Pond: “Amphibian” became “frog,” and “reported/up to” became an exact count. Supported rewrite: “The summarized table lists 14 amphibian species: 9 frogs, 3 salamanders and 2 newts.” This assumes the summary transcribes the table accurately.
- Closing: (1) No; originals can be mistaken, incomplete, staged or misunderstood. (2) A summary may narrow, broaden or alter the original claim, and the original reveals method and context.

Vocabulary

- **Provenance:** the origin and transmission path of information.
- **Original source:** the earliest accessible source in a chain, not automatically the truth.
- **Primary source:** material created during or by participants in the period or event studied.
- **Secondary source:** later analysis or synthesis; it can be more accurate for some questions.

Differentiation

- **Extra support:** provide cards already ordered and ask students to match each quoted phrase to its source.
- **Extra challenge:** explain which combination of records could distinguish construction completion, ceremonial opening and opening to traffic.

⚠ Safety

Use the provided fictional chains. Do not ask students to log in, expose browsing histories or investigate a real individual.

Teacher notes

“Primary” and “secondary” describe relationship to an event, not quality grades. A domain suffix, institutional name, credential or professional design is not automatic proof. Students should follow citations and inspect methods rather than rely on one visual cue.

Previous lesson · Unit overview · Next lesson

Lesson 3: Date and context

Time: about 55–60 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: GPT-5.6 Sol.

Goal

Distinguish event, observation, publication and update times, and identify context missing from cropped text or images.

Materials

Timeline and context cards below, paper, and optional four-time organizer.

Steps

✎ 1. Opening — 6 minutes

Display: “Updated today: Harbor path closed.” Ask whether “today” proves the closure began today or is still active. Collect possibilities before defining the four times.

2. Four times — 12 minutes

- **Event time:** when the thing happened.
- **Observation time:** when someone measured, saw or recorded it.
- **Publication time:** when a report became available.
- **Update time:** when a page or record was changed; the changed part may be unrelated.

A true old item can mislead when presented as current. A new post can contain an old observation. Missing or conflicting dates warrant uncertainty, not a guessed timeline.

3. Timeline case — 14 minutes

Fictional cards:

- **A:** Path inspection form: observed 2 March, 09:00; “erosion makes east section unsafe.”
- **B:** Closure notice published 2 March, 11:30; “closed until repair inspection.”
- **C:** Reopening notice published 6 March, 16:00; “east section reopens 7 March at 08:00.”
- **D:** Screenshot of B reposted 18 March with caption “Closed today.” The screenshot crop omits B’s publication date.
- **E:** Website footer says “page updated 18 March”; change log says only the contact number changed.

Students place events on a timeline and evaluate “The path was closed on 18 March.”

Example good answer: Contradicted by the reopening notice if no later closure exists; D is authentic as an old closure notice but misleading as current. E’s update date does not refresh every claim on the page.

4. Restore quotation context — 10 minutes

Full fictional report:

> “Sensor 2 showed a sharp rise at 10:05. Because maintenance staff were testing it with a heat pad, this reading should not be used as evidence of room temperature. Sensors 1 and 3 stayed between 19°C and 21°C.”

A card quotes only: “Sensor 2 showed a sharp rise at 10:05.” Students answer:

1. Is the quoted text authentic?
2. What meaning changes when the next sentence is removed?
3. What would a fair short quotation include?

Example: The words are authentic, but the crop hides the test condition and can imply real room heating. A fair summary names the heat-pad test and the other sensors.

5. Context without an image file — 10 minutes

Card F describes a crop: “A close crop shows six people beside a bus.” Full-frame description: “The uncropped frame shows a marked drill area, two instructors and a sign reading ‘evacuation practice.’” Ask what the crop establishes and what it does not.

✓ 6. Closing check — 5 minutes

Label each date type: “measured Monday; posted Tuesday; webpage footer changed Friday.” Then write one sentence about why “updated Friday” is insufficient.

Answer guide

- Opening: Updated today does not establish event time or current status; inspect the notice body and change history.
- Timeline: event/observation 2 March, closure publication 2 March, reopening publication 6 March, reopening event 7 March, repost/update 18 March. Claim of closure on 18 March is contradicted within this packet, subject to a possible unrecorded later event.
- Quote: authentic words can be misleading through omission; include the test condition.
- Crop: it supports that six people stood beside a bus at an unknown time. It does not support an emergency rather than a drill.
- Closing: Monday = observation (and possibly event), Tuesday = publication, Friday = update. Update time may concern unrelated page content.

Vocabulary

- **Context:** surrounding information needed to interpret an item fairly.
- **Crop:** a selected portion that may omit relevant surroundings.
- **Event/observation/publication/update time:** four dates that answer different questions.

Differentiation

- **Extra support:** use four differently shaped timeline markers and read each card aloud.
- **Extra challenge:** write two captions for Card D: one accurate historical caption and one current-status caption that honestly says what is unknown.

⚠ Safety

Do not use real disaster images, distressing footage or student photographs. Discuss deceptive framing without asking students to reproduce or share misinformation publicly.

Teacher notes

“Out of context” should name the missing context, not operate as a magic dismissal. Authenticity and relevance are separate. Metadata can help but may be copied or altered; treat it as evidence to corroborate, not infallible truth.

Previous lesson · Unit overview · Next lesson

Lesson 4: Independent corroboration

Time: about 55–60 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: GPT-5.6 Sol.

Goal

Corroborate a claim across sources and avoid double-counting reports that share one origin.

Materials

Source-network cards below, paper, and optional string or arrows for a dependency map.

Steps

✎ 1. Opening — 6 minutes

Ask: “Five pages use the exact phrase ‘record-height river.’ How many independent observations might that represent?” Accept answers from one to five, then ask what would distinguish them.

2. Independence model — 10 minutes

Corroboration is stronger when sources use separate access, data or methods. Agreement among copies may reveal popularity, not independent confirmation. Students should inspect citations, identical wording, timing and shared data.

A source can be independent for one claim but dependent for another. Two analysts may independently interpret the same public dataset, yet they are not two independent measurements of the river.

3. Dependency map — 18 minutes

Claim: “The Lark River reached 8.4 metres on 12 April.”

- **A — Gauge office dataset:** automated reading 8.4 m at 06:00; maintenance log reports normal operation.
- **B — Town bulletin:** “8.4 m,” explicitly citing A.
- **C — Valley News:** repeats the bulletin and uses the phrase “record height.”
- **D — University field team:** manual staff reading 8.3 m at 06:10; method and uncertainty ±0.1 m stated.
- **E — Photo post:** water covers the third stair; no scale, time or location metadata.
- **F — Archive table:** previous documented maximum 8.7 m in 1998.

Students draw source arrows, then answer:

1. How many independent measurements directly bear on 8.4 m?
2. Is “record height” supported?

3. Why is 8.3 ±0.1 consistent with 8.4?

Example answers: A and D are two measurement paths. B and C do not add measurements. F contradicts “record” if records are comparable. D’s interval includes 8.4.

4. Corroboration plan — 8 minutes

Groups choose one next check and say how PASS and FAIL would alter the conclusion. Examples: inspect gauge calibration; obtain a third instrument reading; verify whether 1998 used the same datum. “Search for more pages” is insufficient unless the pages add independent evidence.

✎ 5. Independent practice — 10 minutes

Claim: “All four library rooms lost power at 15:00.”

- One central alarm logged loss of mains power for rooms 1–4.
- Four dashboards each display data copied from that alarm.
- A battery clock in room 3 continued running.
- A staff note says lights went out in room 2.

Students count evidence paths and identify what is and is not contradicted. The battery clock is not a contradiction: it may run without mains power.

✓ 6. Closing check — 5 minutes

Complete: “Three articles that cite the same report count as ___ independent origin(s) for the reported observation, because ___.”

Answer guide

- Opening: possibly one; identical wording and citation trails are clues of copying.
- River: two independent measurement paths (A and D); B/C are dependent. The exact 8.4 m claim is supported within stated measurement tolerance. “Record height” is contradicted by F unless datum or record scope differs. E is weak contextual evidence only.
- Library: the four dashboards are one dependent path from one alarm, not four. The staff note independently supports room 2 only. The battery clock does not test mains power. “All four” has some support from the alarm but lacks independent room-level confirmation.
- Closing: one; repetition does not create a new observation.

Vocabulary

- **Corroborate:** compare evidence from separate sources or methods.
- **Independent source:** one that does not merely derive the relevant observation from another source being counted.
- **Common-source problem:** apparent agreement produced by several reports copying one origin.
- **Uncertainty interval:** a stated range around a measurement.

Differentiation

- **Extra support:** provide arrows from B to A and C to B, then let students complete the map.
- **Extra challenge:** explain how A and D could share a hidden dependency, such as the same height reference marker, and propose a test.

⚠ Safety

Keep source mapping about fictional systems, not classmates' social networks. No live searching or public posting is required.

Teacher notes

Do not reward a raw source count. Ask what method or observation each source adds. Also avoid the opposite mistake: shared data can still support separate interpretations, but those interpretations should not be counted as separate measurements.

Previous lesson · Unit overview · Next lesson

Lesson 5: A conclusion with room to change

Time: about 60 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: GPT-5.6 Sol.

Goal

Synthesize provenance, date, context and corroboration checks into a calibrated conclusion and state what evidence could change it.

Materials

Assessment packet and response prompts below. Students may use notes from earlier lessons.

Steps

✎ 1. Opening — 6 minutes

Introduce three conclusion labels:

- **Supported:** the available evidence warrants the precise claim, with stated limits.
- **Contradicted:** reliable relevant evidence conflicts with the claim.
- **Not enough information:** the available evidence does not distinguish plausible alternatives.

These labels describe the evidence packet now, not permanent truth. A strong conclusion names its scope, uncertainty and a mind-changing condition.

2. Model — 8 minutes

Claim: “The west hall opened at 09:00.” A door log records an authorized unlock at 09:00, but does not record whether the door physically opened. Model: “Not enough information. The log supports authorization at 09:00, not physical opening. A door-position sensor or contemporaneous observation could change the conclusion.”

3. End assessment — 36 minutes

All material below is fictional.

Packet: Bellweather reservoir path

Claim under review: “The reservoir walking path was continuously closed from Monday 4 May through Friday 8 May because the water level exceeded 4.0 metres.”

- **Source A — gauge export:** readings at 08:00 daily: Mon 4.2 m; Tue 4.1 m; Wed 3.9 m; Thu 3.8 m; Fri 3.7 m. The export was generated 9 May. Maintenance log says the gauge passed its 1 May check.

- **Source B — park notice published Monday 10:00:** “Path closed while the gauge is above 4.0 m. Staff will inspect after levels fall.”
- **Source C — repost published Friday:** screenshot of Source B cropped so its Monday publication date is absent; caption: “Still closed.”
- **Source D — inspection record:** observed Wednesday 14:00; “level below threshold; debris remains on east segment; next inspection Thursday morning.” Published to the records portal Thursday.
- **Source E — reopening notice:** “West and central segments reopened Thursday 12:00. East segment remains closed for debris removal.” Published Thursday 11:45.
- **Source F — two local pages:** both say “the whole path stayed closed all week” and both cite Source C; one copies the other’s wording.
- **Source G — walking-club log:** “Thursday 16:00, west segment walk, 2 km.” The club coordinator created the entry Thursday 17:10. No photograph is attached.
- **Source H — map note:** the path has east, west and central segments; “whole path” means all three.

Complete eight tasks:

1. Break the claim into at least three checkable subclaims.
2. For Source A, distinguish observation times from export/publication time and state what it supports.
3. Trace the provenance of F and explain how many independent observations F adds.
4. Explain why C can be authentic yet misleading.
5. Decide whether “the water level exceeded 4.0 m throughout Monday–Friday” is supported, contradicted or uncertain. Cite evidence.
6. Decide whether “the whole path was closed Thursday afternoon” is supported, contradicted or uncertain. Cite evidence and one limitation.
7. Evaluate the full claim using one of the three labels. Write 3–5 sentences with scope and uncertainty.
8. Name one specific new record that could change or sharpen your conclusion, and state how different results would matter.

Students may answer in prose, a table or orally. Do not score speed, handwriting or accent.

4. Reflection — 5 minutes

Students underline one sentence in their answer that distinguishes evidence from inference and circle one uncertainty they communicated honestly.

✓ 5. Closing check — 5 minutes

Complete: “My conclusion is ___ given ___. I would revise it if ___.”

Answer guide

1. Possible subclaims: the whole path was closed Monday through Friday; closure was continuous; water exceeded 4.0 m throughout; high water was the reason for every segment’s closure. Accept equivalent precise decomposition.
2. Observations occurred at 08:00 each day; the export was generated 9 May. A supports above 4.0 m Monday and Tuesday morning, then below 4.0 m Wednesday–Friday morning. Export time does not turn all readings into 9 May observations.

3. Both F pages derive from C, and one copies the other. They add zero independent observations of path status; at most they show the claim was repeated.
4. C may reproduce B accurately, but it omits B's Monday date and pairs it with a Friday "Still closed" caption that B itself cannot support.
5. **Contradicted.** A gives 3.9, 3.8 and 3.7 m Wednesday–Friday mornings. Note that once-daily readings do not prove the level never briefly rose between readings, but they contradict the claim that it exceeded 4.0 throughout.
6. **Contradicted** within the packet. E says west and central reopened Thursday at noon, and G independently reports a west-segment walk at 16:00. Limitation: G is a self-recorded log without a photograph, and E is an announced status rather than direct observation; nevertheless they agree and no contrary independent Thursday observation appears.
7. Model: "The full claim is contradicted by the packet. Gauge readings fell below 4.0 m by Wednesday morning, so high water did not persist through Friday. The east segment remained closed for debris, while the west and central segments were announced reopened Thursday and a separate club log reports use of the west segment. Exact closure times before Thursday are not fully documented, but the whole path was not continuously closed for the stated reason across all five days."
8. Examples: access-control or ranger status log by segment; continuous gauge series; timestamped inspection records. A segment log showing all entrances blocked Thursday would challenge E/G; a log showing west/central open would strengthen the conclusion. A continuous gauge series could detect between-reading rises but would not alone establish path status.

There is no validated pass threshold. Review tasks separately: claim decomposition (1), time/provenance (2–4), evidence judgments (5–6), synthesis (7) and mind-changing evidence (8). Re-teach the specific skill shown by an error and offer a parallel new case.

Vocabulary

- **Calibrated conclusion:** a judgment whose confidence and scope match the evidence.
- **Supported / contradicted / not enough information:** provisional evidence labels, not declarations of certainty.
- **Mind-changing condition:** a specific possible result that would cause revision.

Differentiation

- **Extra support:** give sentence frames: "Source __ directly shows __, but it does not show __." "My label is __ because __." Read the packet aloud or provide one card per page.
- **Extra challenge:** write the strongest defensible version of the original claim after correction, then identify the narrowest remaining uncertainty.

⚠ Safety

Use only the fictional packet. Avoid grading students on confidence of delivery; uncertainty stated with reasons is a strength. Do not require public posting or investigation of real local disputes.

Teacher notes

Students may think “not enough information” avoids making a decision. Require them to name competing explanations and a discriminating next check. Conversely, “supported” does not mean certain forever, and one limitation does not erase all evidence. Search rank, polished formatting, credentials, institutional domain, popularity or repetition should never substitute for the claim-specific analysis.

Previous lesson · Unit overview

Institutions and economics

Subject: History, geography and society Grade: 11 Lessons: 5 Time per lesson: about 40–60 minutes (varies by lesson; see each lesson header)

Status: written (unreviewed AI draft; not human-educator-reviewed or classroom-tested)

Author: DeepSeek-V4-Pro

Big idea

Institutions — legislatures, courts, budgets, and markets — shape how societies make rules, resolve disputes, allocate resources, and measure progress. Understanding how these systems work, and what their indicators leave out, prepares citizens to evaluate policy claims and make informed economic decisions.

What students should be able to do

- Compare how a bill becomes law in a parliamentary system and a presidential system, identifying at least three structural differences.
- Trace a case through a three-tier court hierarchy and explain the role of precedent and constitutional review.
- Analyse a simplified public budget, distinguishing mandatory from discretionary spending and identifying fiscal trade-offs.
- Calculate compound interest, compare real versus nominal returns under inflation, and construct a basic personal budget.
- Evaluate a development indicator (GDP per capita, HDI, or Gini coefficient), explaining what it measures, what it omits, and why uncertainty matters.

What students should already know

Students should be able to read a short informational text, calculate percentages, interpret a bar or line graph, and write a paragraph that states a claim and supports it with evidence. No prior economics or detailed civics knowledge is assumed.

Use this oral diagnostic as a conversation, not an admission gate:

1. If a government spends more than it collects in taxes, what must it do?
2. A bank account offers 5% interest per year. If you deposit $100 and never withdraw, do you have exactly $105 after one year? What might change that?
3. Name one thing GDP (gross domestic product) might fail to capture about a country's well-being.

Diagnostic guide: (1) Borrow, cut spending elsewhere, or raise revenue. (2) Possibly not — taxes on interest, fees, or inflation could reduce real value. (3) Any of: unpaid work, environmental quality, health, inequality, happiness. Accept equivalent answers. Revisit any uncertain answer during the unit rather than excluding students.

Lesson list

1. How a law is made: compare legislative processes in parliamentary and presidential systems; trace a bill from proposal to enactment.
2. Courts and appeals: follow a case through trial, appeal, and supreme review; precedent and constitutional interpretation.
3. Public budgets: analyse revenue sources, mandatory versus discretionary spending, deficits, and fiscal trade-offs using a simplified budget.
4. Interest, inflation, and personal finance: calculate compound interest, distinguish nominal from real returns, and build a personal budget under inflation.
5. Development and indicators: evaluate GDP per capita, the Human Development Index, and the Gini coefficient; discuss what each measures and omits; complete an eight-task assessment.

Materials (whole unit)

Printed or digital copies of the case studies and data tables included in each lesson, paper or note-taking device, calculators (phone or simple), and a board. All fictional legislation, budgets, and data are original CC0 material. No live internet, account, purchase, or personal financial data is required.

Assessment

Lesson 5 contains a compact evidence packet with three development indicators for two fictional countries, eight checkable tasks, and a worked guide. Students may respond in writing, orally, or with a structured table. Do not score speed, handwriting, or accent. Judge each task separately. There is no validated pass threshold, and this short assessment does not measure all institutions-and-economics skills.

Sources

Consulted November 5, 2026:

- UK Government — Legislative process: taking a bill through Parliament informed the parliamentary process description.
- USA.gov — How laws are made informed the presidential-system comparison.
- UK Supreme Court informed the judicial hierarchy description.
- UNDP — Human Development Index informed the HDI description and limitations.
- World Bank — Gini index informed the inequality measurement discussion.
- IMF — Back to Basics: Inflation informed the real-versus-nominal returns explanation.

All fictional legislation, case studies, budgets, data tables, questions, and explanations in this unit are original CC0 material. Linked works remain under their own terms.

Known gaps and cautions

- Legislative processes vary widely across countries; the two models presented (UK parliamentary and US presidential) are illustrative, not exhaustive. Teachers should supplement with their own country's system.
- The judicial lesson uses a fictional common-law system; teachers in civil-law jurisdictions should adapt the precedent discussion.

- Budget numbers are fictional and simplified; real national budgets are far more complex, with off-budget items, multi-year commitments, and accounting conventions not addressed here.
- Personal finance content is general education, not individual financial advice. Students' family circumstances differ; avoid requiring disclosure of personal financial information.
- Development indicators are presented with their known limitations, but the unit does not cover alternative indicators such as the Genuine Progress Indicator, Happy Planet Index, or Multidimensional Poverty Index in depth.
- The unit does not address international institutions (UN, WTO, IMF) or treaty-making processes in detail; teachers may wish to supplement.

Lesson 1: How a law is made

Time: about 45–50 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: DeepSeek-V4-Pro.

Goal

Compare how a bill becomes law in a parliamentary system and a presidential system, identifying at least three structural differences.

Materials

Two flowcharts provided below (parliamentary and presidential), paper or note-taking device, and a board. Optional: a third real or fictional bill summary for extension.

Steps

✎ 1. Opening — 7 minutes

Display: "A proposed law requiring all new buildings over three storeys to include rooftop solar panels has been introduced. Who needs to agree before it becomes law? Does the answer depend on the country?"

Ask students to list every person or group they think must approve a new law. Collect answers on the board without correcting them yet. Typical responses: parliament, president, judges, voters, committees. Tell students: "Today we will trace this same proposal through two different systems and compare the journey."

2. Build the parliamentary model — 12 minutes

Distribute or display the parliamentary flowchart below.

Parliamentary system (UK model):

```
Bill introduced → First reading (title read, no debate)
    → Second reading (general debate, vote on principles)
    → Committee stage (clause-by-clause examination, amendments)
    → Report stage (committee reports back, further amendments)
    → Third reading (final debate, final vote in first chamber)
    → Same stages repeated in second chamber (Lords)
    → Royal Assent (ceremonial, never refused since 1708)
```

Ask students to work in pairs and answer:

1. At which stage can the content of the bill first be changed? (Committee stage)
2. If the second chamber amends the bill, what happens next? (It returns to the first chamber for consideration of amendments — this back-and-forth is called "ping-pong")
3. Who has the final substantive say — the executive, the legislature, or the monarch? (The legislature; Royal Assent is ceremonial)

Discuss: In a parliamentary system, the executive (prime minister and cabinet) sits in the legislature and typically commands a majority. What does this imply about how often government-proposed bills pass? (They pass frequently when the government has a majority, because the executive and legislative majority are the same people.)

3. Build the presidential model — 12 minutes

Distribute or display the presidential flowchart.

Presidential system (US model):

```
Bill introduced (by member of House or Senate)
    → Committee referral (specialised committee holds hearings, marks up the bill)
    → Committee vote (bill dies here if committee takes no action)
    → Floor debate and vote in originating chamber
    → Same process in other chamber
    → If versions differ → Conference committee (reconcile differences)
    → Both chambers vote on identical final version
    → President: sign → law; veto → returns to Congress
    → Congress: 2/3 of both chambers → override veto
```

Ask pairs to answer:

1. Where can a bill die without a floor vote? (In committee — if the committee chair never schedules it for a vote)
2. What happens if the House and Senate pass different versions? (A conference committee of members from both chambers negotiates a single version; both chambers must then approve that identical text)
3. How does the veto differ from Royal Assent? (The veto is a real, frequently used political power; override requires a supermajority. Royal Assent is a formality.)

4. Compare the systems — 10 minutes

Draw or project a comparison table and fill it in with student contributions:

Feature	Parliamentary (UK)	Presidential (US)
Who proposes most bills?	Government ministers (who are also MPs)	Individual members of Congress (though the president proposes a legislative agenda)
Where can a bill be killed?	At any reading vote; rarely in committee	In committee, by a single chair's inaction
Executive's formal role	Ceremonial (Royal Assent)	Substantive (sign or veto)
Can the executive be overruled?	Not applicable (executive leads the majority)	Yes, by 2/3 override
Second chamber's power	Can delay, rarely blocks permanently	Equal to first chamber; must agree on identical text
Party discipline	Strong; members usually vote with party	Weaker; members may cross party lines

Discuss: Why might a country choose one system over the other? What does each system assume about the relationship between the executive and the legislature?

Guide: The parliamentary model assumes the executive and legislative majority should work as a team; bills pass efficiently but minority views may be excluded. The presidential model separates powers intentionally, making law-making slower but requiring broader consensus for major changes.

✓ 5. Closing check — 5 minutes

Ask students to write or state:

1. Name one stage that exists in the presidential system but not in the parliamentary system. (Conference committee, or presidential veto)
2. Why does a parliamentary government's bill rarely fail? (The executive commands a legislative majority, so its bills reliably pass)
3. In which system would an opposition party have more power to block legislation, and why? (Presidential — because party discipline is weaker and the executive does not control the legislative timetable)

Vocabulary

- **bill**: a proposed law that has not yet been enacted
- **first/second/third reading**: formal stages of debate and voting in a legislature
- **committee stage**: detailed, clause-by-clause examination of a bill, where amendments are made
- **Royal Assent**: the monarch's formal approval of a bill, making it an Act of Parliament; in practice never refused
- **veto**: an executive's power to reject a bill passed by the legislature
- **conference committee**: a temporary committee of members from both chambers that resolves differences between House and Senate versions of a bill
- **supermajority**: a voting threshold higher than a simple majority, such as two-thirds

Differentiation

- **Extra support:** Provide a pre-filled comparison table with some cells blank; students fill in only the missing cells. Focus on two differences rather than five.
- **Extra challenge:** Research or reason about a third system (semi-presidential, such as France) and identify where executive and legislative powers overlap versus separate. Or: draft a one-page fictional bill and trace it through both systems, annotating each stage.

⚠ Safety

No safety concerns specific to this lesson. If students raise politically sensitive legislation as examples, steer discussion toward the process (how the bill would move through the system) rather than debating the merits of the policy itself.

Teacher notes

Common misconceptions:

- "The monarch/king signs all laws so they have real power." In the UK, Royal Assent is by convention automatic; the monarch does not refuse. This is an important distinction between ceremonial and substantive power.
- "The US president can make laws." The president can propose legislation and issue executive orders (which have the force of law within the executive branch), but only Congress enacts statutes. Executive orders can be overturned by legislation or court rulings.
- "A bill becomes law as soon as parliament votes." In both systems, there are multiple stages after the initial vote — other-chamber review, reconciliation, and executive action.
- "Committees just review things." In the US system, committees have gatekeeping power: a bill that a committee chair refuses to schedule dies there. This is a substantial, not merely advisory, power.

Lesson 2: Courts and appeals

Time: about 40–45 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: DeepSeek-V4-Pro.

Goal

Trace a case through a three-tier court hierarchy and explain the role of precedent and constitutional review.

Materials

Fictional case summary below, three-tier court diagram, paper or note-taking device, and a board.

Steps

✎ 1. Opening — 7 minutes

Display this case summary:

> **Rivera v National Transport Authority (fictional)**
>
> A law requires all ride-share drivers to hold a commercial licence with 200 hours of supervised driving. Maria Rivera, a ride-share driver with 120 supervised hours and a clean five-year record, argues the regulation violates her constitutional right to pursue a lawful occupation because the 200-hour requirement bears no reasonable relationship to road safety for experienced drivers. The Transport Authority responds that a uniform minimum protects passengers and that courts should defer to the legislature on safety standards.

Ask: "If you were the first judge to hear this case, what facts would you want to know? If you ruled against Ms Rivera, could she do anything about it?" Collect responses. Establish the core idea: losing at one court does not mean the case is over.

2. The court hierarchy — 10 minutes

Draw or project the three-tier structure:

```
Supreme Court / Constitutional Court
        ↑ appeal
  Court of Appeal / Appellate Court
        ↑ appeal
     Trial Court / Court of First Instance
```

Explain each tier:

Trial court (first instance): Hears witnesses, examines evidence, determines facts, applies law to facts, delivers a verdict. This is the only court that hears testimony and evaluates evidence directly.

Appellate court: Reviews the trial court's application of law for errors. Does NOT re-hear witnesses or re-evaluate factual findings unless they are clearly unreasonable. A panel of judges (typically three) decides by majority.

Supreme/Constitutional court: Hears select cases — typically those raising important constitutional questions or where lower appellate courts have disagreed. Decisions bind all lower courts.

Discuss: Why not let every case go to the Supreme Court? (Resources, finality, and the principle that most cases are correctly decided at lower levels. The Supreme Court typically hears fewer than 100 cases per year in systems like the US, out of thousands of petitions.)

3. Trace the case — 10 minutes

Walk through Rivera v National Transport Authority at each tier:

Trial Court: The judge hears testimony from Ms Rivera, driving-safety experts, and Transport Authority officials. The judge finds as fact that experienced drivers with 120 hours and clean records have accident rates statistically indistinguishable from those with 200 hours. The judge rules that the 200-hour requirement, as applied to experienced drivers, violates the constitutional right to pursue a lawful occupation because the means (uniform 200-hour minimum) are disproportionate to the end (road safety for already-safe drivers). The Transport Authority appeals.

Appellate Court: A three-judge panel reviews the legal reasoning, not the facts. They ask: did the trial judge apply the correct legal test for "reasonable relationship"? Two judges affirm: the trial judge correctly applied the proportionality test. One judge dissents, arguing courts should defer to the legislature on safety regulation thresholds. The Transport Authority appeals again.

Supreme Court: The court agrees to hear the case because it raises a recurring constitutional question: how much deference do courts owe legislatures on economic regulation? The court rules 5–4 that courts should apply "intermediate scrutiny" — the regulation must serve an important government objective, and the means must be substantially related to that objective. The court affirms the appellate decision: 200 hours for experienced drivers fails this test. The law is struck down as applied to drivers with clean records and substantial experience.

4. Precedent and constitutional review — 10 minutes

Introduce two concepts:

Precedent (stare decisis): Courts should follow earlier decisions in similar cases. A Supreme Court decision binds all lower courts. An appellate decision binds trial courts in its jurisdiction. This creates predictability: people and governments can arrange their affairs knowing what the law means.

Discuss: What happens if the Supreme Court changes its mind? (It can overrule its own precedent, but it does so rarely and usually explains why — for example, because the old rule proved unworkable or because society's understanding has evolved. Example: Brown v Board of Education (1954, US) overruled Plessy v Ferguson's (1896) "separate but equal" doctrine.)

Constitutional review: Courts can invalidate laws that conflict with the constitution. Not all countries give courts this power. In some (US, Canada, Germany, India), courts can strike down legislation. In others (UK, New Zealand), courts can interpret but not invalidate — parliament remains supreme. In the UK, the Human Rights Act 1998 lets courts issue a declaration of incompatibility, which flags a law as conflicting with rights but does not strike it down. A few countries (Netherlands) explicitly prohibit constitutional review of legislation.

Discuss: Should unelected judges be able to overrule elected legislators? (Guide: this is the "counter-majoritarian difficulty." Arguments for review: constitutional rights protect individuals against majority decisions; judges are insulated from electoral pressure. Arguments against: it transfers power from elected representatives to appointed judges; legislatures can better weigh competing policy considerations.)

✓ 5. Closing check — 5 minutes

Ask students to write or state:

1. What is the key difference between what a trial court does and what an appellate court does? (Trial courts find facts and hear evidence; appellate courts review legal reasoning only.)
2. Why does the Supreme Court not hear every appeal? (Resources, finality, and because it selects cases raising important or unsettled legal questions.)
3. What does stare decisis require, and why is it valuable? (Courts should follow precedent; it provides predictability and stability in law.)

Vocabulary

- **trial court / court of first instance**: the court that hears a case initially, receives evidence, and determines facts
- **appellate court**: a court that reviews the legal decisions of lower courts but does not re-hear evidence
- **precedent / stare decisis**: the principle that courts should follow earlier decisions in similar cases
- **constitutional review**: the power of courts to determine whether legislation complies with the constitution and to invalidate laws that do not
- **proportionality**: a legal test asking whether the means chosen are appropriate and not excessive in relation to the objective pursued
- **dissent**: a judge's written opinion disagreeing with the majority decision
- **jurisdiction**: the authority of a court to hear and decide a case; can be geographic or by subject matter

Differentiation

- **Extra support:** Provide a simplified flowchart of the case journey with blanks for students to fill in. Focus on the three-tier structure; precedent and constitutional review can be discussed rather than tested.
- **Extra challenge:** Research a real constitutional case from any country and compare its journey through the court hierarchy to the fictional Rivera case. Identify where the real case ended and why.

⚠ Safety

The fictional case involves a constitutional challenge to a safety regulation. If students raise real politically contentious cases, steer discussion toward the legal reasoning and procedure, not the merits of the policy. Avoid asking students to disclose personal experiences with courts or legal proceedings.

Teacher notes

Common misconceptions:

- "Appeals mean you get a new trial." An appeal is not a retrial. The appellate court reviews the record from the trial court; it does not hear witnesses again.
- "The Supreme Court must hear every case brought to it." In most systems with a supreme court, the court has discretion to select which cases to hear (certiorari/ discretionary review).
- "If a court strikes down a law, it means the judges are making policy." Courts can only strike down laws that conflict with the constitution, which was enacted by a higher democratic process (constitutional convention, referendum, etc.). But the line between interpretation and policy-making is genuinely contested.
- "All countries have constitutional review." Many do not, or they have weaker forms of it. The UK traditionally followed parliamentary sovereignty — parliament, not courts, had the final say on rights — though the Human Rights Act 1998 introduced a form of judicial review.

Lesson 3: Public budgets

Time: about 40–45 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: DeepSeek-V4-Pro.

Goal

Analyse a simplified public budget, distinguishing mandatory from discretionary spending and identifying fiscal trade-offs.

Materials

Fictional national budget provided below, calculators, paper or note-taking device, and a board.

Steps

✎ 1. Opening — 7 minutes

Display: "A government plans to spend $100 billion next year but expects to collect only $88 billion in taxes. Where could the extra $12 billion come from? And what happens if it doesn't find it?"

Collect student responses — typical answers: borrowing, cutting spending, raising taxes, printing money. Write them on the board without evaluating yet. Ask: "Which of these has long-term consequences beyond next year?" Establish that borrowing and printing money both have future costs (interest, inflation), while cutting spending or raising taxes have immediate political costs.

2. Revenue: where the money comes from — 10 minutes

Distribute or display the revenue side of the fictional budget:

Fictional Republic of Meridia — Annual Revenue ($ billions)

Source	Amount
Personal income tax	34.0
Corporate profits tax	16.0
Value-added tax (VAT) / sales tax	22.0
Social security contributions	10.0
Customs duties and excise taxes	4.0
Other (fees, fines, state-owned enterprise dividends)	2.0
Total revenue	**88.0**

Ask pairs to discuss:

1. Which single tax raises the most revenue? (Personal income tax, 34.0 billion)

2. If the economy enters a recession and corporate profits fall by 20%, approximately how much would corporate tax revenue drop? (About 3.2 billion — from 16.0 to 12.8)
3. Which tax is likely to fall the most in a recession, and why? (Corporate profits tax — profits are highly cyclical. VAT/consumption taxes also fall as people spend less, but usually not as sharply.)

Discuss tax progressivity: Income taxes are often progressive (higher earners pay a higher rate); VAT is generally regressive (everyone pays the same rate on purchases, which consumes a larger share of lower incomes). Why might a government use both? (Income tax for fairness/progressivity; VAT for stable, broad-based revenue that is harder to evade.)

3. Expenditure: where the money goes — 10 minutes

Distribute the expenditure side:

Fictional Republic of Meridia — Annual Expenditure ($ billions)

Category	Amount	Type
Pensions and elderly benefits	24.0	Mandatory
Healthcare	20.0	Mandatory
Debt interest payments	8.0	Mandatory
Unemployment and welfare	6.0	Mandatory
Subtotal: Mandatory	**58.0**	
Defence	12.0	Discretionary
Education	10.0	Discretionary
Infrastructure and transport	6.0	Discretionary
Research and science	2.0	Discretionary
Arts and culture	1.0	Discretionary
Other discretionary	3.0	Discretionary
Subtotal: Discretionary	**34.0**	
Total expenditure	**92.0**	

Key distinction: Mandatory spending is set by existing law — the government cannot change it without passing new legislation and, often, confronting powerful political opposition. Discretionary spending is set annually through the budget process.

Ask pairs:

1. What is the deficit? (Revenue 88.0 minus expenditure 92.0 = deficit of 4.0 billion)
2. What percentage of total spending is mandatory? (58.0 / 92.0 ≈ 63%)
3. If the government must cut 4.0 billion to balance the budget, could it do so by cutting only discretionary spending? (In principle yes, but that would require cutting 4.0 from 34.0 in discretionary spending — about 12% across-the-board cuts to defence, education, infrastructure, etc.)

4. Trade-offs and fiscal policy — 10 minutes

Pose three scenarios and have pairs discuss each for two minutes, then share:

Scenario A: An ageing population means pension costs will rise 2 billion per year for the next five years. What options does the government have? (Raise taxes, cut discretionary spending, reform pension eligibility, increase the retirement age, borrow more — each with different political and economic consequences.)

Scenario B: A recession causes revenue to fall by 10 billion while unemployment benefits rise by 4 billion. Should the government borrow to cover the gap or cut spending elsewhere? (Guide: Most economists argue that during a recession, governments should borrow — cutting spending or raising taxes during a downturn can deepen the recession. This is called counter-cyclical fiscal policy. But borrowing adds to future debt-service costs.)

Scenario C: The government wants to invest 5 billion in green energy infrastructure, which independent analysts estimate will save 1 billion per year in fuel imports after five years and reduce long-term environmental costs. How should this be evaluated against an immediate 5 billion cost? (Guide: This is an investment, not pure consumption. Students should consider the payback period, the uncertainty of the savings estimate, and whether borrowing for investment that generates future returns is different from borrowing for current consumption. Governments often separate "current" and "capital" budgets for this reason.)

✓ 5. Closing check — 5 minutes

Ask students to write or state:

1. What is the difference between mandatory and discretionary spending? (Mandatory spending is set by existing law and cannot be changed without new legislation; discretionary spending is set annually in the budget process.)
2. If a government runs a deficit, what are two ways it can finance the gap? (Borrow by issuing bonds, draw down reserves, or — in some circumstances — print money. Also acceptable: raise taxes or cut spending to eliminate the deficit rather than finance it.)
3. Why might borrowing for infrastructure investment be treated differently from borrowing for current spending? (Infrastructure creates future economic returns that help repay the borrowing; current spending does not.)

Vocabulary

- **revenue**: money a government collects, primarily through taxes
- **expenditure**: money a government spends
- **deficit**: the amount by which expenditure exceeds revenue in a given year
- **national debt**: the accumulated total of past deficits minus any surpluses
- **mandatory spending**: spending required by existing law (entitlements, debt interest)
- **discretionary spending**: spending determined annually through the budget process
- **progressive tax**: a tax where the rate increases as the taxable amount increases
- **regressive tax**: a tax that takes a larger percentage from lower-income earners
- **counter-cyclical fiscal policy**: increasing spending or cutting taxes during a recession, and doing the reverse during a boom

Differentiation

- **Extra support:** Provide a pre-calculated budget with the deficit already identified; students focus only on the trade-off scenarios. Work through Scenario A as a whole class before pairs attempt B and C.
- **Extra challenge:** Research your own country's most recent budget. Identify the largest three revenue sources and the largest three expenditure categories. Compare the proportion of mandatory versus discretionary spending with the fictional Meridia budget.

⚠ Safety

The fictional budget numbers are not based on any real country. If students ask about their own country's budget, direct them to official sources and emphasise that this lesson uses a simplified model. Avoid asking students to disclose their family's experience with taxes or government benefits.

Teacher notes

Common misconceptions:

- "A deficit means the country is broke." A deficit is a one-year gap; it is not the same as insolvency. Most governments run deficits in most years. What matters for sustainability is whether the debt grows faster than the economy over the long term.
- "The government can just print money to pay its bills." In countries that control their own currency, this is technically possible but risks inflation (and hyperinflation in extreme cases). Many countries have independent central banks that are legally prohibited from directly financing government deficits.
- "Mandatory spending can never be changed." It can be changed, but only through new legislation, which is politically difficult. Calling it "mandatory" refers to the legal obligation, not an unchangeable fact.
- "Cutting spending always reduces the deficit by the same amount." If spending cuts reduce economic activity, they may also reduce tax revenue, partly offsetting the deficit reduction. This is the "fiscal multiplier" effect.

Lesson 4: Interest, inflation, and personal finance

Time: about 45–50 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: DeepSeek-V4-Pro.

Goal

Calculate compound interest, distinguish nominal from real returns under inflation, and construct a basic personal budget.

Materials

Calculators (phone or simple), paper or note-taking device, budget template below, and a board. No student financial data is collected.

Steps

✎ 1. Opening — 7 minutes

Display: "Your aunt offers you two options for a $1,000 graduation gift: (A) she gives you $1,200 in three years, or (B) she gives you $1,000 today. Which is worth more?"

Let students discuss in pairs for two minutes. Reveal: the answer depends on what you could earn with $1,000 today. If you can invest it at 5% per year with annual compounding, after three years you would have:

Year 1: $1,000 × 1.05 = $1,050 Year 2: $1,050 × 1.05 = $1,102.50 Year 3: $1,102.50 × 1.05 = $1,157.63

Taking $1,000 today and investing it yields $1,157.63 — less than the $1,200 your aunt offers. So Option A is better... unless prices rise and $1,200 buys less in three years than you think.

2. Compound interest — 12 minutes

Formula: A = P × (1 + r)^n

Where A = final amount, P = principal, r = annual interest rate (as a decimal), n = number of years.

Work through these examples together:

Example 1: $500 invested at 4% for 5 years. A = 500 × (1.04)^5 = 500 × 1.2167 = $608.33

Example 2: $2,000 invested at 3% for 10 years. A = 2,000 × (1.03)^10 = 2,000 × 1.3439 = $2,687.83

Example 3 (the power of time): $1,000 at 7% for 30 years. A = 1,000 × (1.07)^30 = 1,000 × 7.6123 = $7,612.26

Discuss: Why does Example 3 grow so much more? (The combination of a higher rate and a much longer period. This is exponential growth — the interest earns interest on interest. After 30 years, the original $1,000 has more than septupled.)

The Rule of 72: To estimate how many years it takes money to double, divide 72 by the annual interest rate. At 6%, money doubles in approximately 72 ÷ 6 = 12 years. At 9%, about 8 years.

Ask students to verify: at 7.2%, 72 ÷ 7.2 = 10 years. Using the formula: (1.072)^10 = 2.004 — very close to doubling. The Rule of 72 is an approximation that works well for rates between about 4% and 15%.

3. Inflation and real returns — 10 minutes

Nominal return: the stated percentage growth of your money. **Real return:** nominal return minus the inflation rate (approximately).

Example: If your savings account pays 4% interest and inflation is 3%, your real return is approximately 4% − 3% = 1%. You have more money, but it buys only slightly more.

More precisely: Real return = (1 + nominal rate) / (1 + inflation rate) − 1 = 1.04 / 1.03 − 1 = 0.0097 = 0.97% (close to the 1% approximation)

Worked example: Suppose inflation averages 4% per year for 10 years. You have $1,000 in a savings account paying 2% interest.

Nominal value after 10 years: $1,000 × (1.02)^10 = $1,218.99 Real purchasing power: $1,218.99 / (1.04)^10 = $1,218.99 / 1.4802 = $823.51

Your money grew in number but lost about $176 in purchasing power. You would have been better off spending it on something real 10 years ago — or investing in something that outpaced inflation.

Discuss: What kinds of savings or investments tend to beat inflation over long periods? (Stocks/equities historically return 6–8% real over long periods, but with substantial risk and volatility. Real estate, inflation-protected bonds, and some commodities can also preserve purchasing power. Simple bank savings accounts often do not keep up with inflation.)

4. Personal budget — 10 minutes

Distribute the template. Students construct a monthly budget for a fictional young adult earning $2,800 per month after taxes (no real financial disclosure required).

Fictional monthly budget template:

Category	Suggested range	Your allocation
Housing (rent, utilities)	$700–1,100	
Food (groceries, not restaurants)	$300–500	
Transport (transit pass or car costs)	$100–300	
Savings (emergency fund first)	$100–400	
Insurance (health, renters)	$50–150	

Category	Suggested range	Your allocation
Phone and internet	$50–100	
Discretionary (restaurants, entertainment, clothes)	Remainder	
Total	**Must equal $2,800**	

After students fill it in, ask:

1. Did anyone allocate more than $200 to savings? Why or why not? (Guide: building an emergency fund — typically 3–6 months of expenses — is a financial priority before significant discretionary spending. But students at this age may reasonably prioritise differently.)
2. What happens if rent increases by 10% next year but income stays the same? (The student must cut elsewhere, dip into savings, or increase income. This is the reality of fixed budgets under inflation.)
3. What expense category surprised you by being larger or smaller than expected? (Students often underestimate housing costs or overestimate how much is "left over" for discretionary spending.)

✓ 5. Closing check — 5 minutes

Ask students to write or state:

1. Using the Rule of 72, approximately how many years would it take $1,000 to double at 8% interest? (72 ÷ 8 = 9 years)
2. If inflation is 5% and your savings account pays 2%, what is your approximate real return? (2% − 5% = −3% — you are losing purchasing power)
3. Why should an emergency fund come before entertainment spending in a budget? (Emergencies — medical bills, job loss, car repairs — can create debt if uncovered; debt incurs interest that compounds against you, the reverse of saving.)

Vocabulary

- **compound interest**: interest calculated on the initial principal and also on accumulated interest from previous periods
- **principal**: the original sum of money invested or borrowed
- **nominal return**: the percentage growth of an investment before adjusting for inflation
- **real return**: the percentage growth of an investment after adjusting for inflation
- **inflation**: a general increase in prices and fall in the purchasing value of money
- **Rule of 72**: an approximation for doubling time: divide 72 by the annual interest rate
- **emergency fund**: savings set aside for unexpected expenses, typically 3–6 months of living costs
- **purchasing power**: the quantity of goods and services that a unit of currency can buy

Differentiation

- **Extra support:** Pre-calculate the compound interest examples and provide a completed budget with one category intentionally over-budget; students identify and fix the error rather than starting from scratch. Work the Rule of 72 examples as a whole class.

- **Extra challenge:** Research current interest rates on savings accounts and current inflation rates in your country. Calculate the real return on savings. Then research the historical average real return of a diversified stock portfolio (such as the S&P 500) over 30 years and compare.

⚠ Safety

Do not require or encourage students to disclose their own or their family's financial situation, income, debt, or savings. Use only fictional numbers and the provided template. If students ask personal financial questions ("is my family's rent too high?"), respond that this lesson uses general numbers and suggest they speak with a trusted adult for personal guidance. This unit provides general financial literacy education, not individual financial advice.

Teacher notes

Common misconceptions:

- "Interest is always good." Interest works against you on debt. If you carry a credit card balance at 20% interest, that compounds against you — a $1,000 balance becomes $1,200 in one year, $1,440 in two. Paying off high-interest debt is often the best "investment" available.
- "Inflation means everything gets more expensive equally." Inflation is an average; some prices rise faster (healthcare, education, housing in many countries) while others rise slower or fall (electronics, clothing). Personal inflation depends on what you actually buy.
- "Saving a small amount doesn't matter." Small, regular savings compound dramatically over long periods. Saving $50 per month from age 25 to 65 at 6% annual return yields about $99,600 using the future-value-of-annuity formula.
- "You need to be rich to invest." Many countries now offer fractional shares and low-cost index funds with no minimum investment. The key is consistency and time, not initial wealth.

Lesson 5: Development and indicators

Time: about 55–60 minutes (untested estimate)

Status: unreviewed AI draft; not classroom-tested. Author: DeepSeek-V4-Pro.

Goal

Evaluate a development indicator (GDP per capita, HDI, or Gini coefficient), explaining what it measures, what it omits, and why uncertainty matters. Complete an eight-task assessment synthesising the unit.

Materials

Fictional data cards for two countries below, calculators, paper or note-taking device, and assessment tasks (included at end of lesson).

Steps

✎ 1. Opening — 7 minutes

Display: "Country X has a GDP per capita of $42,000. Country Y has a GDP per capita of $8,000. Is the average person in Country X better off?"

Let students discuss for two minutes. Then introduce complications: What if Country X has extreme inequality — a small number of billionaires and widespread poverty? What if Country Y has universal healthcare, clean air, and low crime? What if Country X's GDP includes $5,000 per person in pollution-cleanup costs that Country Y never incurs?

Establish the key idea: a single number cannot capture human well-being. We need multiple indicators, and we need to know what each one hides.

2. Three development indicators — 15 minutes

Introduce each indicator with its definition, how it is calculated, and a limitation.

GDP per capita: Total market value of all goods and services produced in a country in a year, divided by population.

- What it captures: average economic output per person; correlates with access to goods, services, and infrastructure
- What it omits: unpaid work (caregiving, subsistence farming), environmental costs, leisure time, income distribution, health, happiness, the underground economy
- Example omission: If a country cuts down its forests and sells the timber, GDP rises. The lost ecosystem services (clean water, carbon storage, biodiversity) are not subtracted.

Human Development Index (HDI): A composite of life expectancy at birth, mean and expected years of schooling, and gross national income per capita (PPP-adjusted). Published by

the UN Development Programme. Ranges from 0 to 1; countries are classified as low, medium, high, or very high human development.

- What it captures: a broader picture than GDP alone, combining health, education, and income
- What it omits: inequality within each dimension (the IHDI — Inequality-adjusted HDI — addresses this), political freedom, environmental sustainability, subjective well-being, gender disparities beyond the aggregate numbers
- Example omission: A country could have high HDI while excluding an ethnic minority from schools and hospitals. The average hides the distribution.

Gini coefficient: A measure of income inequality ranging from 0 (perfect equality — everyone earns the same) to 1 (perfect inequality — one person earns everything). Most countries fall between 0.25 and 0.60.

- What it captures: how evenly or unevenly income is distributed
- What it omits: wealth inequality (which is typically much higher than income inequality), absolute poverty levels (a country can have low inequality because nearly everyone is equally poor), the causes of inequality, and whether the trend is improving or worsening

Discuss: Why might two countries with the same GDP per capita have very different HDIs and Gini coefficients? (One might invest in health and education while the other does not; one might distribute income broadly while the other concentrates it.)

3. Compare two fictional countries — 10 minutes

Distribute data cards:

Country A: Valdoria (fictional)

Indicator	Value	Year	Source note
GDP per capita (USD)	$41,200	2025	National accounts
Gini coefficient	0.48	2025	Household survey, ±0.03 margin
HDI	0.78	2025	UNDP methodology
Life expectancy	75 years	2025	Vital registration
Mean years of schooling	9.5 years	2025	Census
CO_2 emissions per capita	14.2 tonnes	2025	Territorial accounting
Population below national poverty line	18%	2025	±2 percentage points

Country B: Meridia (fictional)

Indicator	Value	Year	Source note
GDP per capita (USD)	$18,900	2025	National accounts
Gini coefficient	0.31	2025	Household survey, ±0.03 margin
HDI	0.82	2025	UNDP methodology
Life expectancy	79 years	2025	Vital registration
Mean years of schooling	11.0 years	2025	Census
CO_2 emissions per capita	4.8 tonnes	2025	Territorial accounting
Population below national poverty line	11%	2025	±2 percentage points

Ask pairs to discuss:

1. Which country has the higher GDP per capita, and by how much? (Valdoria: $41,200 vs Meridia's $18,900 — more than double)
2. Which country has the higher HDI? (Meridia: 0.82 vs Valdoria: 0.78 — the gap is much smaller than the GDP gap)
3. Which country has lower inequality? (Meridia: Gini 0.31 vs Valdoria 0.48)
4. Which country has longer life expectancy and more schooling? (Meridia: 79 years and 11.0 years vs Valdoria's 75 years and 9.5 years)
5. What might explain why Valdoria has higher GDP but lower life expectancy and schooling? (Higher inequality means the average is pulled up by high earners; spending on health and education may be lower relative to GDP; environmental costs may affect health.)

Discuss: If a journalist wrote "Valdoria is twice as rich as Meridia," would that be accurate? Complete? (GDP per capita is roughly double, so "twice the average economic output" is numerically accurate. But calling this "twice as rich" without noting Meridia's longer life expectancy, higher schooling, lower poverty, lower inequality, and lower emissions presents a misleading picture of which country's citizens are better off.)

4. Uncertainty — 5 minutes

Point out the margins of error in the data cards (±0.03 for Gini, ±2 percentage points for poverty rate). Ask:

- If Valdoria's poverty rate is 18% ± 2 points and Meridia's is 11% ± 2 points, is it possible the true gap is as small as 3 percentage points? (Yes: Valdoria's true rate could be as low as 16% and Meridia's as high as 13% — a gap of only 3 points instead of the measured 7.)
- Why does uncertainty matter for policy? (If you can't confidently rank two countries or detect a change over time, policy decisions based on small differences may be misplaced.)
- What can governments do to reduce uncertainty? (Larger surveys, better registration systems, more frequent data collection.)

✎ 5. Assessment — 8 tasks (about 20 minutes)

Distribute the assessment. Students may work individually or in pairs. Allow written, oral, or tabled responses.

Assessment tasks (Valdoria vs Meridia):

1. **Claim:** "Meridia's citizens are healthier than Valdoria's." What evidence supports this claim, and what does the available data NOT tell us? (Answer guide: Life expectancy supports the claim — 79 vs 75 years. But life expectancy is an average; it does not tell us about infant mortality, disease burden, mental health, or quality of life in old age. Individual health varies within both countries.)

2. **Evidence selection:** A politician says Valdoria's higher GDP means its economic policies are better. Identify two pieces of evidence from the data cards that challenge this conclusion and explain why each matters. (Answer guide: Meridia has lower inequality — a larger share of its population benefits from economic output. Meridia also has lower poverty — 11% vs 18%. Either suggests that while Valdoria produces more, Meridia distributes the benefits more broadly.)

3. **Inference:** Based on the data, what can you reasonably infer about the relationship between GDP per capita and environmental impact? What cannot you infer? (Answer guide: Valdoria's higher GDP correlates with much higher CO_2 emissions — this is consistent with the historical pattern that richer countries consume more energy. But you cannot infer that GDP growth always causes higher emissions; some countries have decoupled emissions from GDP growth through clean energy and efficiency.)

4. **Counter-evidence:** A student argues "higher GDP per capita means a better life." Using at least two specific data points, explain why this generalisation fails for Valdoria and Meridia. (Answer guide: Despite Valdoria's GDP being more than double Meridia's, Meridia has longer life expectancy (79 vs 75), more schooling (11.0 vs 9.5 years), lower poverty (11% vs 18%), and lower inequality (0.31 vs 0.48). Any two of these suffice.)

5. **Uncertainty:** The Gini coefficient for both countries has a margin of ±0.03. Could Meridia's true Gini be higher than Valdoria's true Gini? Explain using the ranges. (Answer guide: No. Valdoria's range is [0.45, 0.51]; Meridia's is [0.28, 0.34]. These ranges do not overlap, so even at the extreme of uncertainty, Valdoria's inequality is higher. The finding is robust to the stated measurement error.)

6. **Institutional connection:** Suppose Meridia's parliament is considering a law to raise the minimum wage. Which indicator(s) from the data cards would you track to evaluate whether the law had its intended effect, and what trend would count as success? (Answer guide: Track the Gini coefficient (should fall if the policy reduces inequality) and the poverty rate (should fall if low-wage workers are lifted above the poverty line). Also acceptable: track GDP per capita to check for any negative effect on output. Success = Gini falls and/or poverty falls, without a significant drop in GDP per capita. Acknowledge that other factors may also affect these indicators.)

7. **Personal finance connection:** A young person in Meridia earns the equivalent of $15,000 per year after taxes, and inflation is running at 4%. If they receive a 5% raise, what is their approximate real income increase? If they instead receive a 3% raise, what happens to their purchasing power? (Answer guide: 5% raise − 4% inflation ≈ 1% real increase, from $15,000 to about $15,150 in purchasing power. 3% raise − 4% inflation ≈ −1% real decrease — they have more dollars but can buy slightly less. Precise: real = 1.03/1.04 − 1 = −0.96%.)

8. **Synthesis:** In 3–5 sentences, evaluate this statement: "Development is best measured by GDP per capita." Use evidence from this unit as well as concepts from earlier lessons (budgets, institutions) in your response. (Answer guide: A strong response notes that GDP per capita measures average economic output but omits distribution (Gini), health and education (HDI components), environmental costs, and unpaid work. It should reference that Meridia has lower GDP but better outcomes on multiple indicators. It should connect to budget concepts — a country might have high GDP but allocate its budget to defence rather than health or education, producing worse social outcomes. A sophisticated response acknowledges GDP's value as one indicator among several, not its dismissal.)

Assessment scoring guidance: Score each task 0–2 (0 = no valid attempt, 1 = partially correct or incomplete, 2 = substantially correct with reasoning). Maximum 16 points. This is a classroom assessment, not a standardised test; there is no validated pass threshold. Use results to identify concepts that need re-teaching, not to assign grades.

Vocabulary

- **GDP (Gross Domestic Product)**: the total market value of all final goods and services produced within a country in a given period
- **GDP per capita**: GDP divided by population; an average, not a typical person's income
- **HDI (Human Development Index)**: a composite index of life expectancy, education, and income
- **Gini coefficient**: a measure of income inequality from 0 (perfect equality) to 1 (perfect inequality)
- **purchasing power parity (PPP)**: an adjustment that compares what currencies can actually buy in their home countries rather than using market exchange rates
- **margin of error**: a range expressing the uncertainty in a statistical estimate
- **indicator**: a measurable variable used to assess a condition or trend that cannot be observed directly

Differentiation

- **Extra support:** Provide the Valdoria-Meridia comparison table with the fourth column ("Meridia") blank; students fill in only the missing values before attempting assessment tasks 1–4. Tasks 6–8 can be discussed orally rather than written.
- **Extra challenge:** Research a real country pair with contrasting development profiles (e.g., Costa Rica vs Qatar, or Vietnam vs Equatorial Guinea). Compare GDP per capita, HDI, and Gini, and discuss what each pairing reveals about the limits of GDP as a development measure.

⚠ Safety

No safety concerns specific to this lesson. The fictional countries are not allegories for any real nation. If students draw parallels to real countries, steer discussion toward what the indicators reveal and away from judging any country's citizens or policies.

Teacher notes

Common misconceptions:

- "GDP measures well-being." GDP was designed to measure economic output, not welfare. Its creator, Simon Kuznets, warned in 1934: "The welfare of a nation can scarcely be inferred from a measurement of national income." Students should internalise that every indicator answers a specific question; none answers "is life good?"
- "Higher HDI means a country is better in every way." HDI combines only three dimensions. A country with high HDI might have significant political repression, environmental degradation, or gender inequality. The Inequality-adjusted HDI and Gender Development Index address some of these gaps.
- "The Gini coefficient tells you whether poverty is high or low." The Gini measures distribution, not level. A country where everyone earns $1 per day has a Gini of 0 — perfect equality, but everyone is poor. Use the Gini alongside poverty rates and absolute income levels.

- "Data with margins of error is unreliable." All real-world data has uncertainty. Knowing the margin of error is better than having no uncertainty estimate at all. A measurement with a stated ±2% error is more trustworthy than one that claims perfect precision.

Proposed K–12 Arts Progression (Draft Framework)

Status: written framework (not lessons); unreviewed AI draft; CC0 1.0
Author: Claude Opus 5.5
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> **Important:** this maps a proposed sequence of skills and kinds of work in the arts. Only kindergarten and grades 1, 2, 3, 4, 6 and 10 have written units so far (two in grade 3; one each in grades 4, 6 and 10); the rest are outlines. It is not aligned to any official standard. Which artists, musicians, songs, plays, dances and traditions students meet is a local choice; a teacher should choose them, include local and family traditions where welcome, and check the plan against their own requirements.

Principles

1. **Making before naming.** Students mix colours, clap rhythms, move and act before they learn the words for what they did. Vocabulary arrives to describe something they have already tried.
2. **Every child makes.** The arts are not only for students who already seem "talented". Every lesson has a part everyone can do, and harder choices for those who want them.
3. **Process over polish.** Sketchbooks, rehearsals, drafts and recordings of practice count as much as a finished piece. Students keep and look back at early attempts.
4. **Look at and listen to real work from many places.** Every band includes works from different cultures, times and media, including living and local artists, not only a short list of famous names.
5. **Original work, credit and copyright.** Students make their own work, say where their ideas came from, and learn that other people's work usually needs permission or a licence. Creative Commons licences are one example: all current ones except CC0 require attribution.
6. **Safety is content.** Tools, materials, voices and bodies are handled safely: non-toxic materials, cutting and heat rules, warm-ups before movement, safe volume levels, and space to move without collisions.
7. **Kind, specific feedback.** Responses name something that works, ask a question, and suggest one change, using the vocabulary of the art form. Feedback is about the work, not the person.

Strands

Strand	Short name
Visual art and design (drawing, painting, printmaking, sculpture, photography, digital image)	Visual art
Music (singing, playing, listening, composing)	Music
Drama (role play, improvisation, scripted performance, stagecraft)	Drama

Strand	Short name
Dance and movement (body, space, time, energy, making and performing dances)	Dance

Two ways of working run through every strand and every grade:

- **Making and presenting:** exploring materials and ideas, planning, practising, revising, sharing with an audience.
- **Responding:** describing what is seen or heard, interpreting what it might mean, asking about its context, and giving and using feedback.

Schools that cannot offer all four strands every year might rotate them; the grade notes below give one possible emphasis for each, not a requirement to teach everything.

Some vocabulary used across grades

- **Elements of art:** the seven most commonly listed are line, shape, texture, form, space, colour and value (lightness or darkness).
- **Music:** pulse (steady beat), rhythm, pitch (high and low), tempo (fast and slow), dynamics (loud and soft), timbre (sound quality), structure (for example repeat, verse and chorus, ABA).
- **Drama:** role, character, setting, tension, voice, gesture, still image ("freeze frame"), audience.
- **Dance:** body, action, space (levels, directions, pathways), time, energy, relationships (with partners and groups).

Approaches teachers may recognise

- **Orff Schulwerk** (Carl Orff and Gunild Keetman, 1920s): largely improvisational music-making in which children sing, play, move and dance, often using small xylophones, glockenspiels and metallophones with removable bars, plus recorders and simple percussion.
- **Kodály method** (developed in Hungary in the mid-20th century, inspired by Zoltán Kodály): singing-based, using movable-do solfège and hand signs, starting from folk songs.
- **Dalcroze eurhythmics** (Émile Jaques-Dalcroze, early 20th century): teaches rhythm, structure and musical expression through movement.
- **Process drama** (developed from the work of Brian Way, Dorothy Heathcote and Gavin Bolton): usually the whole class and the teacher work in role together inside a made-up scenario, stepping in and out of role to explore a problem.

This framework does not require any one approach.

Bands

Band	Ages	Focus
K-2	5-8	Play and explore: try materials, sounds and movements; copy and invent; share with the class; say what you notice.
3-5	8-11	Control and choice: practise techniques on purpose, plan a small piece, use simple notation, give and use specific feedback.
6-8	11-14	

Band	Ages	Focus
		Intention and context: make work that communicates an idea, study how and why artists in different times and places worked, revise from feedback.
9-12	14-18	Voice and depth: sustained projects, deeper study in at least one chosen art form, portfolios, performance or exhibition, credit and licensing.

Grade by grade

Lines without a "Unit written" link are outlines only.

- **Kindergarten.** Visual: explore crayons, paint, clay and collage; name colours and kinds of line (straight, wavy, zigzag). Music: sing simple songs and rhymes; keep a steady beat with body percussion; hear loud/soft and fast/slow. Drama: pretend play with a story; move like characters. Dance: move freely and stop on a signal; travel high, middle and low. Responding: "What do you see? What do you hear?" **Unit written:** units/arts/K-lines-colours-and-beat/ (lines, colour names, steady beat); units/arts/K-mixing-printing-loud-and-quiet/ (term 2: mixing two colours, printing, collage, loud/quiet, fast/slow); units/arts/K-acting-a-story-exhibition-and-song/ (term 3: freeze frames, moving in character, acting a folk tale, a class exhibition and a song share).
- **Grade 1.** Visual: mix two colours to make a new one (for example yellow and blue make green); print with found objects; notice pattern. Music: tell pulse from rhythm (clap the beat, then clap the words); sing high and low notes. Drama: freeze frames from a familiar story. Dance: a short movement sequence with a clear beginning, middle and end. Responding: say one thing you like about a classmate's work and why. **Unit written:** units/arts/1-drawing-from-looking/ (term 1: shapes inside objects, following the edge, rubbings and texture, light and dark marks; the grade 1 year plan puts drawing from looking here because mixing and printing came in kindergarten term 2); units/arts/1-rhythm-pitch-and-rounds/ (term 2: steady beat and the rhythm of words, ta and ti-ti picture rhythm cards, higher and lower notes, a two-part round); units/arts/1-stick-puppets-and-a-story-show/ (term 3: making stick puppets, a short story with a beginning, middle and end, changing one part with "yes, and", a class puppet show).
- **Grade 2.** Visual: observational drawing of a real object; texture rubbings; a simple self-portrait. Music: play untuned and tuned percussion; make and read simple picture or stick notation for rhythms. Drama: retell a story in role with voice and gesture changes. Dance: mirror a partner; repeat and vary a movement. Responding: compare two artworks or songs from different places. **Unit written:** units/arts/2-collage-and-texture/ (term 1: real and drawn texture, a class paper bank of rubbings, prints and drawn marks, tearing, cutting and overlapping, repurposing found materials, calm and busy). **Unit written:** units/arts/2-beat-rhythm-and-tune/ (term 2: beats in twos and threes, ta, ti-ti and a one-beat rest with standard notation, an ostinato under an original song, so, mi and la, and choosing tempo and dynamics for a lullaby or a march). **Unit written:** units/arts/2-a-class-dance/ (term 3: shapes and levels, symmetrical and asymmetrical shapes, pathways, turning and circling, fast, slow and still, mirroring a partner, and a group weather dance with a beginning, middle and end, drawn on a dance map and performed for another class).
- **Grade 3.** Visual: choosing a palette (compare red-yellow-blue with cyan-magenta-yellow; neither is "the" set of primaries); many mixes of one colour from observation; opposite (complementary) colours for contrast; warm and cool colours; tints and shades to show near and far; a finished painting in every lesson. Music: pentatonic improvising on tuned percussion; simple rounds; first staff notation for a few notes. Drama: improvise a scene from a prompt with a problem to solve. Dance: travel along pathways (straight, curved) in

groups. Responding: describe, then interpret ("I see… so I think…"). **Unit written:** units/arts/3-colour-mixing/ (term 1). **Unit written:** units/arts/3-reading-singing-and-making-tunes/ (term 2: do, re, mi, so and la in stick and letter notation, E, G and A on the staff, an original three-part round, question-and-answer improvising, and composing, writing down and performing an eight-beat tune). **Unit written:** units/arts/3-a-short-play-from-a-script/ (term 3: theatre from an original script, The Lost Lamp: parts of a script, voice and movement for a character, improvising a new scene inside limits, set, props, costume and sound, stage left and right, rehearsing with a checklist, and performing for another class).

- **Grade 4.** Visual: symmetry and pattern in design traditions from several cultures; simple printmaking (relief block from foam or card). Music: an instrument skill (for example recorder or ukulele, if available); verse and chorus structure; composing a 4-bar rhythm. Drama: process drama with the teacher in role around a class question; writing in role. Dance: a group dance in canon (staggered start) and unison. Responding: specific feedback with one suggestion, then revise once. **Unit written:** units/arts/4-ostinato-rounds-song-form/ (music).
- **Grade 5.** Visual: form and space in sculpture (clay, card or recycled materials); overlap and size to suggest depth. Music: compose a short melody and notate it; ABA form; play in a small ensemble. Drama: a short scripted scene with blocking (where actors stand and move) and a simple prop or costume list. Dance: a dance telling a story or showing a process (for example a seed growing, a machine). Responding: research one artist or musician from a chosen tradition and present where and how they worked.
- **Grade 6.** Visual: one-point linear perspective (horizon line and a vanishing point); how Italian Renaissance artists such as Brunelleschi and Alberti studied it, and how earlier and other traditions show importance or depth in different ways. Music: chords and accompaniment (for example three chords on keyboard, guitar or ukulele); singing in two parts. Drama: character motivation and status; a devised piece in groups. Dance: choreographic devices (repetition, contrast, levels); peer feedback on a group piece. Responding: an artwork as evidence about the time and place it came from. **Unit written:** units/arts/6-one-point-perspective/.
- **Grade 7.** Visual: design process for an audience (poster, book cover or logo): brief, sketches, feedback, final; type and image together. Music: the timbre of instruments and voices across musical traditions; making music with free or school-licensed digital tools. Drama: a scene from a published play (school-licensed or public domain), with staging choices justified. Dance: a dance tradition studied with care, ideally with a local practitioner; learn and perform part of it with credit. Responding: compare two interpretations of the same song, scene or subject.
- **Grade 8.** Visual: photography or digital image: composition (rule of thirds, framing, light); editing honestly and labelling edited images. Music: songwriting (lyrics, melody, structure) in pairs or groups; recording a draft. Drama: technical theatre roles (lighting, sound, set, stage management) for a short class production. Dance: composing a dance to a chosen piece of music, with written notes so another group could learn it. Responding: copyright, credit and licences in practice: find a reusable image or sound, record its licence and credit it correctly.
- **Grade 9.** Choice begins: students may go deeper in one or two strands. Shared work: a sketchbook or process journal; an artist or composer study from outside the student's own background; a group piece combining at least two art forms (for example music for a short film or a dance with projected images).
- **Grade 10.** A themed project developed over several weeks from research to finished work, with documented feedback and revision. Ensemble or production experience (band, choir, play, dance piece or exhibition team). Responding: write a short review of a live or recorded

performance or exhibition using evidence from the work. **Unit written:** units/arts/10-devising-a-scene/ (drama).

- **Grade 11.** Deeper study of technique and context in the chosen form. Cross-links: colour and light (with physics of waves and light), sound and pitch (frequency), and how instruments make sound. Responding: how art is funded, shown, sold, protected and shared; an artist's rights and a community's rights over traditional works.
- **Grade 12.** An independent portfolio or performance project: proposal, planned timeline, process record, final work, a short artist's statement, and peer review using an agreed checklist. Optional: a public exhibition or performance for the school community, with permissions and credits handled properly.

Links to other progressions

- **Mathematics:** symmetry and pattern (grades 1, 4), scale and perspective (grade 6), fractions and ratio in rhythm and time signatures (grades 3-5). See the mathematics progression.
- **Science:** sound and how instruments vibrate, and light and colour, especially alongside waves in grade 11. See the science progression.
- **Language and literacy:** stories and scripts, writing in role, reviews and artist's statements. See the language and literacy progression.
- **Computing:** digital images, digital music tools, and licences and credit for reused media. See the computing progression.
- **History, geography and society:** artworks, songs and buildings as sources about the past (grade 6 onward). See the history, geography and society progression.

Known gaps and cautions

- Fifteen arts units are written so far (kindergarten term 1, lines, colours and a steady beat; kindergarten term 2, mixing colours, prints and collage, loud and quiet; kindergarten term 3, acting a story, a class exhibition and a song share; grade 1 term 1, drawing from looking; grade 1 term 2, beat, rhythm, high and low, and a round; grade 1 term 3, stick puppets and a class show; grade 2 term 1, collage and texture; grade 2 term 2, beat, rhythm and tune; grade 2 term 3, a class dance; grade 3 term 1, choosing colours for a painting; grade 3 term 2, reading, singing and making tunes; grade 3 term 3, a short play from a script; grade 4, ostinatos, rounds and song form; grade 6, one-point perspective; grade 10, devising a short scene). The first two kindergarten units mix visual art and music, and the third mixes drama, visual art (choosing work to show) and music; of the others, four are visual art, four are music, three are drama and one is dance. Every other grade above is an outline.
- Grade placement is judgement, not research. Many schools teach these skills in a different order or concentrate on fewer strands.
- Studying living cultural traditions, especially dance, music or images with religious or community meaning, needs care: ask practitioners or communities where possible, credit sources, and avoid treating traditions as costumes.
- Materials safety (glazes, solvents, sharp tools, kilns) and music volume need local rules; this document only flags them.
- The cited sources are general encyclopedia articles, not research on arts education outcomes.
- No human educator has reviewed this progression.

Sources

- Wikipedia, "Elements of art" (seven most common elements: line, shape, texture, form, space, color, value): https://en.wikipedia.org/wiki/Elements_of_art
- Wikipedia, "Color wheel" (primary, secondary and tertiary colours): https://en.wikipedia.org/wiki/Color_wheel
- Wikipedia, "Perspective (graphical)" (Italian Renaissance study of linear perspective; Brunelleschi, Alberti and others): https://en.wikipedia.org/wiki/Perspective_(graphical)
- Wikipedia, "Orff Schulwerk" (Carl Orff and Gunild Keetman, 1920s; instruments with removable bars): https://en.wikipedia.org/wiki/Orff_Schulwerk
- Wikipedia, "Kodály method" (Hungary, mid-20th century; movable-do solfège; hand signs; folk music): https://en.wikipedia.org/wiki/Kod%C3%A1ly_method
- Wikipedia, "Dalcroze eurhythmics" (Émile Jaques-Dalcroze; rhythm, structure and expression through movement): https://en.wikipedia.org/wiki/Dalcroze_eurhythmics
- Wikipedia, "Process drama" (whole class with teacher in role; Brian Way, Dorothy Heathcote, Gavin Bolton): https://en.wikipedia.org/wiki/Process_drama
- Wikipedia, "Creative Commons" (all current CC licences except CC0 require attribution): https://en.wikipedia.org/wiki/Creative_Commons

Kindergarten Arts: Lines, Colours and a Steady Beat (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 6 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check materials and movement notes against your school's rules. Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the arts progression | Kindergarten year plan

Big idea

Artists look carefully and then make marks; musicians listen carefully and keep together. In this unit children notice kinds of line, draw something real by looking at it, name the colours they use, and keep a steady beat together with their bodies.

This is the first arts unit of the kindergarten year (term 1). Term 2 goes on to mixing two colours, printing and collage, and loud/quiet and fast/slow sounds.

Outcomes

By the end of the unit a student can:

1. Make and name at least three kinds of line: straight, wavy and zigzag (curly is a bonus).
2. Draw a real object (a leaf, shell or toy) by looking at it, and say one thing they looked at ("I looked at the bumpy edge").
3. Name at least six colours in their drawing materials (for example red, yellow, blue, green, orange, purple, brown, black, white, pink).
4. Keep a steady beat with the class for about eight beats (patting knees, clapping or stepping), and stop on a signal.
5. Say whether a drum pattern is steady ("you could march to it") or not.

Prior knowledge

- None needed. Some children will not yet hold a crayon with control; that is expected. Thick crayons, chunky pencils and big paper help.
- Colour words may be known first in a home language. Welcome them, then add the classroom word alongside.

Lessons

Lessons are short (20-25 minutes). Leave a day or two between lessons. The steady-beat warm-up from lesson 4 can be reused for a minute or two on other days.

Lesson	Title	Main activity
1	Lines everywhere	Find and draw straight, wavy, zigzag and curly lines
2	Look, draw, look again	Draw a leaf or shell by looking at it
3	What colour is it?	Colour hunt and naming the colours in our boxes

Lesson	Title	Main activity
4	Our steady beat	Body percussion and walking to a drum; stop on a signal
5	Beat and colour show	Share drawings, a steady-or-not listening game, end-of-unit check

Materials (whole class unless noted)

- Thick crayons or chunky coloured pencils in at least ten colours, one set per table. Large paper (A3 if possible; A4 is fine).
- Line cards: four large cards, one each showing a straight, wavy, zigzag and curly line.
- Objects to draw (lesson 2): leaves, shells, pine cones or simple toys, one per child or pair, large enough to see clearly. The science senses unit's nature trays can be reused.
- A colour hunt basket (lesson 3): everyday objects in clear single colours (a red block, a yellow duck, a blue cup, a green leaf, an orange, a purple scarf, a brown stick, a black sock, a white cloth, a pink ribbon).
- A hand drum or tambourine (or a saucepan and wooden spoon). Optional: a short recording of music with a clear beat, at a low volume.
- Lesson 3: a large sheet with ten circles, one coloured in each colour of the basket, labelled with the colour word by the teacher.
- Space to move (hall or cleared classroom) for lesson 4.
- Access (as needed): raised line cards (string or a glue line dried on card) for lessons 1-2, a sand tray, ear defenders.

Assessment

- Lessons 1-3: the teacher notes each child's line words, one "I looked at..." sentence and their colour names during table work (observe; no writing needed).
- Lesson 4: watch who can keep the beat with the group and stop on the signal.
- Lesson 5: a 5-part picture/talk/movement check with an answer guide. Plan an extra small-group or one-to-one slot in the week to finish per-child checks; 25 minutes is not enough for the whole class.

⚠ Access and safety

- Movement is always opt-in in form: a child can pat knees sitting down, tap a table, nod, or watch and join later. Keeping the beat with any body part counts.
- Some children find drums or group clapping too loud. Keep the drum soft, offer ear defenders or a quieter spot, and let them tap a beat on their own lap.
- Some children see some colours differently from others. Do not mark a colour name as wrong on that basis alone; note it and, if it seems consistent, mention it to the family kindly. In the colour checks (lesson 3 and lesson 5 part 3), a child succeeds by naming the colours they can tell apart: skip pairs they consistently mix (often red/green or blue/purple) and choose other objects instead. For a child with low vision, use large, bright objects held close and let them handle each one.
- Pointing, signing or an AAC device counts the same as saying, in every lesson and every check part.
- Deaf or hard-of-hearing children can rest a hand on the drum or the table to feel the beat, and watch the beater; this works for the steady-beat lessons and for check parts 4 and 5.

- Drawing objects: no tiny items that could be swallowed; wash shells and leaves before use; check the school's allergy list for plants.
- Children who cannot hold a crayon well can point to line cards, use a thick marker, draw with a finger in a sand tray, or use a tablet drawing app.

Sources

Read for this unit:

- Wikipedia, "Pulse (music)": https://en.wikipedia.org/wiki/Pulse_(music) . Used for: pulse as a series of evenly spaced beats, the scaffolding for rhythm; nearly any listener can match the pulse by tapping evenly.
- Wikipedia, "Beat (music)": https://en.wikipedia.org/wiki/Beat_(music) . Used for: the beat as what listeners tap their toes to.
- Wikipedia, "Contour drawing": https://en.wikipedia.org/wiki/Contour_drawing . Used for: drawing the outline shape of a subject rather than small details, which is the approach in lesson 2.
- Wikipedia, "Color term": https://en.wikipedia.org/wiki/Color_term . Used for: a colour term is a word for a colour; colour and shape words are used together when describing things.
- This repository's arts progression, kindergarten line (lines, colour names, steady beat, stop on a signal).

Known gaps

- No official arts standard was read for this unit; the content comes from the arts progression and the kindergarten year plan, which are drafts.
- The order, objects and songs are my choices. The chants in lesson 4 are original to this unit (CC0); a teacher may swap in local action songs.
- English colour words only; which colours have their own everyday names varies, so treat the list as an example.
- Drama and dance appear only lightly (moving to a beat, stopping on a signal); the kindergarten year plan gives acting a story to term 3.
- Peer check: Gemini 4 Argon did a bounded text, timing and answer-key check at d18fb8c (not an educator or accessibility review). Its notes (missing materials, colour-vision and low-vision routes for the colour checks, non-speaking and deaf or hard-of-hearing routes) were fixed in the follow-up commit 923156d (see PEERCHECKS.md), which Argon also diff-checked the same day.

Lesson 1: Lines everywhere

Goal: Children make and name straight, wavy and zigzag lines (curly is a bonus), and find them around the room.

Length: about 20 minutes.

Materials

- The four line cards (straight, wavy, zigzag, curly).
- Large paper and thick crayons for every child.

Steps

✎ Opening (3 min)

Draw a line slowly in the air with one finger. "Artists make lines. Watch my finger." Show the straight card and draw a straight line in the air together. Then wavy ("like water"), zigzag ("like a mountain, up and down") and curly ("round and round like a snail shell").

✎ Main activity: line hunt and line paper (12 min)

1. Line hunt (4 min): "Can you find a straight line in our room?" Children point (door edge, table edge, window frame). Then wavy (a curtain, hair), zigzag (a pattern on a jumper, a stair rail) and curly (a spring, a drawing of a snail). Accept any sensible find.
2. Line paper (8 min): each child fills a big sheet with lines. Call out a kind of line; they draw it and then choose a new colour. Say the words as they draw: "Long straight line... now a wavy line, slowly..."
3. Walk round and ask: "Which line is this? Show me a zigzag."

✓ Discussion questions (3 min)

- "Which line was the hardest to draw?" (Answer guide: any honest answer; zigzag and curly are often harder because the line changes direction.)
- "Point to a wavy line on your paper." (Answer guide: a line that goes gently up and down without sharp corners.)

✓ Closing check (2 min)

Hold up each card in a new order. Children say the name together, then a few children answer on their own. (Answer guide: the cards are straight, wavy, zigzag, curly; a zigzag has sharp corners and a wavy line has smooth bends.)

Vocabulary

line, straight, wavy, zigzag, curly

Differentiation

- Access: offer raised line cards (string or a dried glue line) for children with low vision. Pointing, signing or AAC counts the same as saying.
- Support: trace the lines on the cards with a finger first, or draw in a sand tray.
- Stretch: draw a picture using all four kinds of line (for example a house with a zigzag roof and curly smoke).

⚠ Safety

- Crayons only on paper; check no crayons are put in mouths.

Teacher notes

- Keep the sheets; children will look back at them in lesson 5.

Lesson 2: Look, draw, look again

Goal: Children draw a real object by looking at it, and say one thing they looked at.

Length: about 25 minutes.

Materials

- One object per child or pair: a leaf, shell, pine cone or simple toy.
- Large paper and thick crayons or chunky pencils.
- The line cards from lesson 1.

Steps

✎ Opening (3 min)

"Yesterday we made lines. Today we use lines to draw something real." Show a leaf. "Artists look, then draw a little, then look again."

✎ Explain and model (5 min)

Draw the leaf large on a big sheet while thinking aloud: "I look at the edge. It goes up... then it has a point. I draw that. Now I look again. The edge is bumpy here, so I draw a wavy line." Draw the outline first, then add one or two lines inside (for example the middle line of the leaf). Point out the kinds of line you used.

✎ Main activity: look, draw, look again (12 min)

1. Each child chooses an object and puts it right in front of their paper.
2. "Draw it big, so it fills your paper." Begin with the outside shape.
3. Every so often, say "Look again!" Children stop and look at their object before drawing more.
4. When the outline is done, add any lines or marks they can see inside it, then colour it with the colours they see.
5. Walk round and ask: "What did you look at? What kind of line is this edge?" Note one "I looked at..." sentence per child (see assessment).

✓ Closing check (5 min)

A few children hold up their drawing next to their object. Each says one thing they looked at: "I looked at the bumpy edge." Others say one thing they notice in the drawing. (Answer guide: any real feature of the object counts: the edge, the point, the lines, the colour, the spots. Praise looking, not "neatness".)

Vocabulary

look, draw, edge, outline, shape

Differentiation

- Access: a child with low vision can explore the object by touch first and use a raised line card to feel what "edge" means. Pointing, signing or AAC counts the same as saying.
- Support: draw round a finger that traces the object's edge in the air first; or draw just the outline.
- Stretch: draw the object a second time from a different side.

⚠ Safety

- Wash shells and leaves before use; no tiny objects; check the allergy list for plants.

Teacher notes

- Drawings will not look "right", and that is fine. The skill is looking back at the object, not copying exactly. Drawing the outline shape first, rather than small details, is the idea behind contour drawing (see the unit sources).
- Keep the drawings for lesson 5.

Lesson 3: What colour is it?

Goal: Children name at least six colours in their drawing materials and match them to everyday objects.

Length: about 20 minutes.

Materials

- The colour hunt basket (see the unit materials).
- Each table's crayon or pencil set.
- A large sheet with ten circles, one coloured in each colour, labelled by the teacher.

Steps

✎ Opening (3 min)

Take the red block out of the basket. "What colour is this?" Hold it next to the red circle on the sheet. Do the same with two more objects. Welcome colour names in home languages, then say the classroom word too.

✎ Main activity: colour hunt and crayon sort (10 min)

1. Colour hunt (4 min): give each pair one object from the basket. They find the crayon that matches and hold both up together. Say the name together.
2. Crayon sort (6 min): each table lays out its crayons. "Find red. Find yellow. Find blue..." Then children choose a favourite crayon and tell a partner, "My favourite is ___."
3. Walk round and note which colours each child names (see assessment).

✓ Discussion questions (5 min)

- "Can you find something in our room that is the same colour as your favourite crayon?" (Answer guide: accept any close match; colours in the room will not be exactly the same, so "nearly the same" is a good answer.)
- "What colours did you use for your leaf or shell last time?" (Answer guide: whatever they used; ask why: "because it was brown".)

✓ Closing check (2 min)

Hold up five crayons, one at a time: red, yellow, blue, green, purple. Children say the name. (Answer guide: the names as listed. Note any child who seems to mix up particular pairs, such as red and green, every time; see the access note in the unit README: a child succeeds by naming the colours they can tell apart, and pointing, signing or AAC counts the same as saying.)

Vocabulary

red, yellow, blue, green, orange, purple, brown, black, white, pink, colour, favourite

Differentiation

- Support: start with three colours (red, yellow, blue) and add more over the week.
- Stretch: name a light and a dark version ("light blue, dark blue").

⚠ Safety

- Check basket objects are clean and too large to swallow.

Teacher notes

- Mixing colours waits for term 2. If a child asks "how do you make green?", say "That's a great question; we'll find out later this year."

Lesson 4: Our steady beat

Goal: Children keep a steady beat together for about eight beats and stop on a signal.

Length: about 20 minutes.

Materials

- A hand drum or tambourine (or a saucepan and wooden spoon).
- Space to move. Optional: music with a clear beat at a low volume.

Steps

✎ Opening (3 min)

Sitting in a circle. "Put your hand on your chest. Can you feel a thump, thump?" (Some can, some can't; that's fine.) "Music has a thump too. It's called the beat. It stays the same, like a clock: tick, tick, tick."

✎ Main activity: pat, clap, step (10 min)

1. Pat the beat (3 min): the teacher plays a slow, even beat on the drum. Everyone pats knees with it. Chant together (original to this unit):

   Pat, pat, pat your knees,
   Pat them slowly, if you please.
   Clap, clap, clap your hands,
   Clap together, like a band.

One pat or clap on each beat. 2. Stop! (2 min): agree a stop signal (two quick taps on the drum, or a raised hand). Keep the beat, then give the signal; everyone freezes. Repeat a few times. Children love being caught moving; keep it friendly. 3. Step the beat (5 min): stand up and walk around the space, one step for each drum beat. Play slower (giant steps), then a little faster (mouse steps), but always even. Freeze on the signal.

✓ Discussion questions (5 min)

- "Was it easier to keep the beat when it was slow or fast?" (Answer guide: any honest answer; many children find a medium beat easiest.)
- "What else has a steady beat?" (Answer guide: a clock ticking, footsteps when walking, a dripping tap, a heartbeat; accept other sensible ideas.)

✓ Closing check (2 min)

Sitting down. The teacher plays eight even beats; children pat along, then stop on the signal. (Answer guide: watch for pats that land with the drum; note who joins in steadily. Keeping the beat with any body part counts.)

Vocabulary

beat, steady, slow, fast, stop, freeze

Differentiation

- Access: deaf or hard-of-hearing children can rest a hand on the drum or the table to feel the beat and watch the beater. Pointing, signing or AAC counts the same as saying.
- Support: pat the beat on the child's hand or shoulder gently, only if they are happy with that; or let them watch your hands.
- Stretch: one child plays the drum and the class follows them.

⚠ Safety

- Clear the floor before stepping; walk, don't run. Keep the drum soft; offer ear defenders or a quieter spot (see the unit README).

Teacher notes

- The beat is the even pulse you would tap your toes to; the words of the chant are the rhythm. In grade 1 children learn to tell the two apart. For now, just the beat.
- Reuse "pat the beat" for a minute on other days, for example while lining up.

Lesson 5: Beat and colour show

Goal: Children share their drawings and say what they looked at, tell a steady beat from an uneven one, and take the end-of-unit check.

Length: about 25 minutes.

Materials

- Children's line papers (lesson 1) and drawings (lesson 2).
- The line cards, the colour hunt basket and the drum.

Steps

✎ Opening (3 min)

Pat the beat together with the lesson 4 chant, then freeze on the signal.

✎ Main activity: our class show (10 min)

1. Lay the drawings out on tables like an exhibition. Children walk round slowly ("gallery feet").
2. Each child stands by their drawing. The teacher visits a few: "Tell us one thing you looked at." Others say one colour or kind of line they can see in it.

✎ Listening game: steady or not? (5 min)

The teacher plays two patterns on the drum, one at a time:

- A: eight even beats.
- B: eight beats with uneven gaps (some quick, some slow).

After each, ask: "Could you march to that?" Children march on the spot to check. (Answer guide: A is steady; you can march to it. B is not steady; marching keeps going wrong.) Play them again in a different order.

✓ Closing check (7 min)

Begin with the whole class, then finish one-to-one or in small groups at another time in the week (see assessment). One mark for each part.

1. Lines: show the four line cards. "Point to the zigzag. Now the wavy one." (Answer: zigzag has sharp corners; wavy has smooth bends. Both correct = 1.)
2. Looking: "Tell me one thing you looked at when you drew." (Answer: any real feature of their object, such as the edge, point or spots.)

3. Colours: hold up six objects from the basket, one at a time. (Answer: six correct colour names = 1. A child with a colour-vision difference names six colours they can tell apart; swap out pairs they consistently mix. For low vision, hold large objects close and let the child handle them.)
4. Beat: the teacher plays eight even beats; the child pats along and stops on the signal. (Answer: pats mostly with the drum and stops = 1. A deaf or hard-of-hearing child rests a hand on the drum or watches the beater.)
5. Steady or not: play pattern A and pattern B. "Which one could you march to?" (Answer: A, the even one. Play each pattern on a table the child can touch, or let them watch the beater, if hearing is a barrier.)

In every part, pointing, signing or an AAC device counts the same as saying.

Vocabulary

show, exhibition, steady, uneven, march

Differentiation

- Support: for part 3, start with three colours; for part 1, accept the child drawing the line instead of pointing.
- Stretch: the child plays a steady beat on the drum for the class.

⚠ Safety

- Walk slowly around the exhibition; keep the drum soft.

Teacher notes

- Send drawings home or keep a few for a term 3 exhibition, as the year plan suggests.
- Many children will keep the beat only some of the time. That is normal at this age; the beat comes back in term 2 (loud and quiet, fast and slow).

Kindergarten Arts: Mixing Colours, Prints and Collage, Loud and Quiet, Fast and Slow (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 6 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check materials, allergy and movement notes against your school's rules.

Back to the arts progression | Kindergarten year plan | Term 1 arts unit

Big idea

Artists make new things from what they have: two paints mixed together make a new colour, one object pressed again and again makes a pattern, and torn paper pieces make a new picture. Musicians choose how they play: loud or quiet, fast or slow, and they can change it on purpose.

This is the second arts unit of the kindergarten year (term 2). It builds on term 1's colour names and steady beat. Term 3 goes on to acting a familiar story and a class exhibition and song share.

Outcomes

By the end of the unit a student can:

1. Mix two paints to make a new colour, and say which two colours they used ("I mixed yellow and blue and got green").
2. Make a print by pressing an object in paint and lifting it, and repeat it to make a row or pattern.
3. Make a collage by tearing or cutting paper shapes, trying where they go, then sticking them down; say one thing about it.
4. Hear and show whether a sound is loud or quiet, and play or move loudly and quietly on purpose.
5. Hear and show whether a beat is fast or slow, and know that loud and fast are different (a sound can be quiet and fast).

Prior knowledge

- Term 1 arts: colour names (red, yellow, blue, green, orange, purple and others), keeping a steady beat, stopping on a signal.
- Some children have not used paint or glue before; a first "just try it" turn is part of learning.

Lessons

Lessons are short (20-25 minutes). Leave a day or two between lessons so paintings and collages can dry.

Lesson	Title	Main activity
1	Two colours make a new one	Guess, then mix two paints on a plate

Lesson	Title	Main activity
2	Press, lift, look: printing	Print with sponges, corks and leaves; make a row
3	Tear, try, stick: collage	Make a collage creature or place from paper pieces
4	Loud and quiet, fast and slow	Play and move to a drum; show loud/quiet and fast/slow
5	Rainstorm story and gallery	A class sound story, a gallery walk and the end-of-unit check

Materials (whole class unless noted)

- Non-toxic, washable ready-mixed paint in red, yellow, blue and white (and, if available, magenta and cyan; see lesson 1 teacher notes). Paper plates or palettes, short thick brushes, water pots, paper towels.
- Aprons or old shirts; table covers.
- Printing objects (lesson 2): small sponge pieces, corks, cotton reels or short cardboard tubes, washed leaves, and children's own fingers. Shallow trays with a thin layer of paint (a damp sponge pad under the paint helps).
- Collage materials (lesson 3): coloured and textured paper, old magazines and cards checked for suitable pictures, tissue paper; glue sticks; child safety scissors (optional; tearing is fine). Base paper, A4 or A3.
- A hand drum or tambourine (or a saucepan and wooden spoon); optional shakers (for example rice sealed in taped containers) and other simple instruments.
- Space to move for lesson 4 (hall or cleared classroom).

Assessment

- Lessons 1-3: the teacher notes during table work which two colours each child mixed and what they said, whether they repeated a print, and one thing they said about their collage (observe; no writing needed).
- Lesson 4: a closing check with hand signs for loud/quiet and fast/slow.
- Lesson 5: a 5-part show-and-talk check with an answer guide (about 3 minutes per child). Plan extra small-group or one-to-one slots in the week; 25 minutes is not enough for the whole class.

⚠ Access and safety

- Paints, glue and printing objects must be non-toxic and washable. Check the school's allergy list (for example latex in some sponges, plants for leaf prints, food-based materials). Do not use food for printing (such as cut potatoes or fruit) in a class with food allergies, and never let children eat materials.
- Some children dislike wet or sticky hands. Offer brushes, sponges on pegs, thin gloves, or a partner who presses while the child chooses where.
- Scissors are optional: tearing paper is a real collage technique. Children who find tearing or cutting hard can choose pre-cut pieces.
- Loud sounds: some children find drums or group noise too loud. Keep the loudest sounds short, offer ear defenders or a quieter spot, and let a child show loud and quiet with their hands instead of playing.
- Movement is opt-in in form: a child can show fast and slow by tapping, nodding or moving hands, seated or wheeling. Any clear way counts.
- Some children see some colours differently. In lesson 1, the check is "which two did you mix", not "name the new colour correctly".

- Children who are deaf or hard of hearing can feel the drum's vibration (a hand on the drum or a table), watch the player's arm, and use the same hand signs; adapt the listening checks to what they can perceive.

Sources

Read for this unit:

- Wikipedia, "Color mixing": https://en.wikipedia.org/wiki/Color_mixing Used for: there are different mixing models; paints and lights mix differently, and the result depends on the paints. This is why the unit says mixing two paints "usually" makes a colour and asks children to look at what actually happened.
- Wikipedia, "Printmaking": https://en.wikipedia.org/wiki/Printmaking Used for: a print is made by transferring ink or paint from an object (the matrix) to paper, and the same object can make many similar prints.
- Wikipedia, "Collage": https://en.wikipedia.org/wiki/Collage Used for: collage (from French coller, to glue) makes a new whole by assembling pieces such as coloured papers and clippings stuck to a base.
- Wikipedia, "Dynamics (music)": https://en.wikipedia.org/wiki/Dynamics_(music) Used for: dynamics are the variation in loudness in music.
- Wikipedia, "Tempo": https://en.wikipedia.org/wiki/Tempo Used for: tempo is the speed or pace of music.
- This repository's arts progression and the kindergarten year plan term 2 arts cell.

Known gaps

- No official arts standard was read for this unit; the content comes from the arts progression and the kindergarten year plan, which are drafts.
- Paint mixes vary with the paints used: red and blue school paints often make a dull purple or brown. The unit asks children to report what they saw, but it does not teach colour theory.
- The words "dynamics" and "tempo" are not taught; children use loud, quiet, fast and slow. The rainstorm story in lesson 5 is original to this unit (CC0) and can be swapped for a local story.
- Drama and dance appear only lightly (moving loudly/quietly and fast/slowly); acting a story is in term 3.
- Peer check: GPT-6.1 Terra did a bounded text and materials check at b5def7d (not an educator, classroom, safety or accessibility review); its three points were fixed in 6a397f2 and ada645c. Terra then diff-checked those fixes; its remaining lesson 2 point (children could not know which object made each card) was fixed in 680925b, where the teacher prints the cards in front of the children.

Lesson 1: Two colours make a new one

Goal: Children mix two paints to make a new colour and say which two colours they used.

Length: about 25 minutes.

Materials

- Non-toxic, washable paint in red, yellow and blue (white optional), in small blobs on a paper plate for each child or pair.
- Short thick brushes, water pots, paper towels, aprons, table covers.
- Paper for each child. A large sheet for the teacher's demonstration.

Steps

✎ Opening (4 min)

Show yellow and blue paint. "These are two colours we know. What are they?" (Yellow, blue.) "What do you think will happen if I mix them together?" Take a few guesses; every guess is fine. Mix them slowly on the big sheet. "What happened?" (Answer guide: usually a green. Accept the colour the children see.)

✎ Main activity: guess, mix, look (13 min)

1. Guess first (2 min): "Today you are colour makers. Before you mix, you guess." Show the three pairs on a card: yellow + blue, red + yellow, red + blue.
2. Mix (8 min): children mix one pair at a time in a clean space on their plate, then paint a patch or a shape with it. Clean the brush in water and dab it on a towel between mixes. An adult goes round asking, "Which two did you use? What did you get?"
3. Add white (3 min, optional): add a little white to one mix. "What happened?" (Answer guide: it usually looks lighter or paler.)

✓ Discussion questions (5 min)

- "What did yellow and red make?" (Answer guide: usually orange; accept what they saw.)
- "What did red and blue make?" (Answer guide: often purple, but with many school paints it comes out dark, dull or brownish. Both are real results.)
- "Did everyone's green look the same?" (Answer guide: no; more yellow or more blue changes it. That's fine; artists make many greens.)

✓ Closing check (3 min)

Each child holds up or points to one mix. "Which two colours did you use?" (Answer guide: the two paints they really used, for example "yellow and blue". Pointing to the two paint blobs counts. The check is about which two went in, not about naming the new colour.)

Vocabulary

mix, new colour, paint, brush, lighter, guess

Differentiation

- **Support:** mix only yellow and blue; the adult says "yellow and blue make..." and the child finishes or points.
- **Stretch:** "Can you make a green that is more yellowy? More bluey?" or "Can you make a light green?"
- **Different ways to mix:** finger-mixing (only if happy with wet hands), a sponge on a peg, or pointing to which two paints a partner should mix.

⚠ Safety

- Non-toxic, washable paints only; aprons on; no paint near mouths or eyes. Wash hands afterwards.

Teacher notes

- How paint mixes depend on the paints. Red and blue often make a dull purple because many "red" paints lean towards orange. If you have magenta and cyan paints, magenta + cyan usually gives a brighter purple; it is fine to show this as "different paints mix differently" without teaching colour theory.
- Do not say "red, yellow and blue make all colours". They do not; and grade 3 arts treats the choice of a palette as a choice, not a rule.
- Keep a few dry patches for lesson 5's gallery.

Lesson 2: Press, lift, look: printing

Goal: Children make a print by pressing an object in paint and lifting it, and repeat it to make a row or pattern.

Length: about 25 minutes.

Materials

- Shallow trays with a thin layer of non-toxic paint (two or three colours per table); a damp sponge pad under the paint helps.
- Printing objects per table: small sponge pieces, corks, cotton reels or short cardboard tubes, washed leaves (vein side down). Fingers count too.
- Paper for each child (long strips are good for rows), aprons, paper towels.
- For the closing check: three blank cards, plus a cork and a sponge with paint (the teacher prints the cards in front of the children).

Steps

✎ Opening (4 min)

Press a cork in paint and then on paper; lift it slowly. "What did it leave?" (A circle; a mark the same shape as the end of the cork.) "That's a print. The cork left its shape behind." Press it again next to the first. "Now there are two the same."

✎ Main activity: press, lift, look (14 min)

1. Try each object (5 min): press, lift, look. "What shape did it make?" A sponge, a cork, a leaf, a finger.
2. Make a row (6 min): choose one object and print it again and again in a row along a strip of paper.
3. Change one thing (3 min): make a second row that changes something each time, for example cork, sponge, cork, sponge, or red, yellow, red, yellow.

✓ Discussion questions (4 min)

- "Why do all the cork prints look nearly the same?" (Answer guide: the same cork made them; it leaves the same shape.)
- "Are they exactly the same?" (Answer guide: not quite; some have more paint or are lighter. That's part of printing.)
- "What happens if you press with too much paint?" (Answer guide: it smudges or blobs; a thin layer works better.)

✓ Closing check (3 min)

With the children watching, the teacher makes three prints on separate cards, saying the object each time ("cork... sponge... cork"), and lays each card next to the object that made it. Then put the objects to one side and hold up the three cards. "Two of these were made by the same thing. Which two? Which object made them?" (Answer guide: the two cork prints, made by the cork. The children saw each card being made, so they can know the answer, not just guess from how the marks look.) Then each child shows their own row and says or points to the object they used; they know this because they chose it.

Vocabulary

print, press, lift, row, the same, pattern

Differentiation

- **Support:** start with finger prints; an adult holds the paper steady.
- **Stretch:** an AB pattern of two objects or two colours; or an ABB pattern.
- **Different ways to print:** a sponge on a peg or a cork in a clothes peg for children who prefer not to touch paint; a partner presses while the child chooses where.

⚠ Safety

- Non-toxic paints only. No food for printing in this lesson (see allergy note in the README). Wash leaves first and check plants against the allergy list.

Teacher notes

- Printing makes repeats easy, which links to pattern work in mathematics.
- Let prints dry flat; keep some for lesson 5's gallery.

Lesson 3: Tear, try, stick: collage

Goal: Children make a collage by tearing or cutting paper shapes, trying where they go, then sticking them down, and say one thing about it.

Length: about 25 minutes.

Materials

- Coloured, textured and tissue paper; old magazines and cards checked for suitable pictures. Optionally, children's dry prints and mixed-colour patches from lessons 1 and 2.
- Glue sticks; child safety scissors (optional); a base sheet for each child.
- A finished example made by the teacher, and a few pieces of paper ready to tear in front of the class.

Steps

✎ Opening (4 min)

Show the example. "This picture is made of pieces of paper stuck together. It has a special name: collage. The word comes from a French word that means to glue." Tear a piece slowly. "Tearing makes a soft, fuzzy edge. Cutting makes a sharp edge."

✎ Main activity: tear, try, stick (14 min)

1. Choose (2 min): "Today you can make a creature or a place: a garden, a house, a pond."
2. Tear and cut (5 min): make a pile of shapes: big, small, long, round.
3. Try before sticking (3 min): move the pieces around on the base sheet. "Try it here. Try it there. Which do you like?"
4. Stick (4 min): glue on the back of each piece, press it down.

✓ Discussion questions (4 min)

- "What did you make?" (Answer guide: any description.)
- "Which edge do you like: torn or cut? Why?" (Answer guide: any honest answer with a reason; for example "torn looks like fur".)
- "Why did we try before we stuck?" (Answer guide: so we can change our minds; once it's stuck it's harder to move.)

✓ Closing check (3 min)

Pairs show their collages to each other. Each child says one thing: "I stuck a ... " or "I tore a ... for the ... ". (Answer guide: any sentence or pointing that names one piece and what it is for.)

Vocabulary

collage, tear, cut, stick, glue, edge, piece

Differentiation

- **Support:** pre-cut and pre-torn pieces; the adult holds the base sheet.
- **Stretch:** use a print or colour patch from earlier lessons as part of the collage; overlap pieces to make something look in front.
- **Different ways to make:** a child who cannot tear or cut chooses pieces and says where they go; a partner or adult sticks them.

⚠ Safety

- Child safety scissors only, used sitting down; carry them closed. Glue sticks, not liquid adhesives that need adult handling. Check magazine pictures in advance.

Teacher notes

- Collage lets children who find drawing hard make a confident picture.
- Leave collages to dry flat; they are the main exhibits in lesson 5.

Lesson 4: Loud and quiet, fast and slow

Goal: Children hear and show loud and quiet, and fast and slow, and play or move each way on purpose.

Length: about 20 minutes.

Materials

- A hand drum or tambourine (or a saucepan and wooden spoon).
- Optional shakers or other simple instruments, one per child or pair.
- Space to move.

Steps

✎ Opening (3 min)

Sitting in a circle. "Last term we kept a steady beat. Today we choose how to play it." Agree two hand signs: **loud** = hands wide apart; **quiet** = hands close together. Play a few loud and quiet taps; children show the sign.

✎ Main activity: choose how to play (10 min)

1. Loud and quiet (3 min): everyone pats knees with the drum. The teacher plays loud, then quiet; children copy. "Quiet as a mouse... loud as a lion." Keep the loud parts short.
2. Fast and slow (3 min): agree two more signs: **fast** = quick little taps on the knees; **slow** = big slow pats. The teacher plays fast and slow; children copy. Then stand up and walk: slow giant steps, fast tiny steps, freeze on the stop signal.
3. Mix them up (4 min): the teacher plays **quiet and fast** (tiny quick taps), then **loud and slow** (big booms). "Can a sound be quiet AND fast?" (Yes.) Children copy on knees or shakers.

✓ Discussion questions (4 min)

- "Is fast the same as loud?" (Answer guide: no. Fast is about how quickly the sounds come; loud is about how big each sound is. We played quiet and fast.)
- "When might we use quiet sounds?" (Answer guide: a lullaby, when a baby is asleep, sneaking like a mouse; accept other sensible ideas.)
- "When might we use loud sounds?" (Answer guide: a parade, cheering, thunder; accept other sensible ideas.)

✓ Closing check (3 min)

The teacher plays four short examples in a mixed order and says before each one which question it asks: "Listen: loud or quiet?" (two examples, one loud and one quiet, at the same speed) or "Listen: fast or slow?" (two examples, one fast and one slow, at the same loudness). Every sound is both loud or quiet and fast or slow, so children answer only the question asked, with the matching hand sign. (Answer guide: watch who shows the sign that matches the question; a child who shows the other pair of signs has answered a different question, so ask again.)

Vocabulary

loud, quiet, fast, slow, the same, change

Differentiation

- **Support:** practise loud/quiet only first; add fast/slow on another day.
- **Stretch:** a child plays the drum and the class shows the signs; or a child plays "getting louder" or "getting faster" slowly.
- **Different ways to show:** signs with one hand, nodding big or small, pointing to four picture cards (lion, mouse, rabbit, tortoise).

⚠ Safety

- Keep loud parts short; offer ear defenders or a quieter spot. Walk, don't run, during fast steps. See the README for access notes for deaf and hard-of-hearing children (feel the drum, watch the arm).

Teacher notes

- Musicians call loudness "dynamics" and speed "tempo"; those words are for later grades. Kindergarten uses loud, quiet, fast and slow.
- Children often get louder when they get faster. Practising "quiet and fast" helps them separate the two.

Lesson 5: Rainstorm story and gallery

Goal: Children use loud/quiet and fast/slow in a class sound story, share their colour mixes, prints and collages, and show what they learned.

Length: about 25 minutes, plus one-to-one check time.

Materials

- The drum and any shakers; children's knees and hands work too.
- Children's dry work from lessons 1-3, laid out on tables as a gallery.
- Paint blobs (red, yellow, blue) and a cork with a paint tray for the check.
- A class list for recording "yes", "with help" or "not yet".

Steps

✎ Opening (3 min)

"Today we'll make a rainstorm with sounds, and then visit our gallery."

✎ Main activity 1: the rainstorm story (8 min)

Tell the story (original to this unit, CC0); children make the sounds with fingers, hands and knees, following the teacher.

> The sky is grey. A few raindrops fall: drip... drip... drip.
> (Quiet and slow: one finger tapping a palm.)
> More rain comes: pitter-patter, pitter-patter.
> (Quiet and fast: fingers tapping quickly.)
> Now it's pouring!
> (Loud and fast: hands patting knees quickly.)
> BOOM... BOOM... BOOM goes the thunder!
> (Loud and slow: three big pats on the knees, or three drum beats, with a long gap between each.)
> The storm moves away. Pitter-patter... drip... drip...
> (Getting quieter and slower.)
> The sun comes out. Shhh.
> (Hands still.)

Do it twice. The second time, a child can lead with the drum.

✎ Main activity 2: gallery walk (8 min)

Walk round the work. At three or four pieces the teacher asks the maker (if they want to share): "What did you do here?" Others say one thing they like.

Closing (6 min)

"Which part of the storm was loud? Which part was quiet and fast?" Children choose one thing they made this unit and tell a partner about it.

✓ End-of-unit check (one-to-one or in a small group)

About 3 minutes per child. Any child may show in their own way (pointing, signing, using a device, hand signs, feeling the drum).

Part	Ask or watch	Looking for
1	Point to one of their colour mixes (or mix two paints now): "Which two colours did you use?"	Names or points to the two paints really used.
2	"Make a print with this cork and lift it. Can you make another one the same?"	Presses, lifts, and repeats the print.
3	Look at their collage: "Tell me about one piece."	Says or points to one piece and what it is or does.
4	Teacher plays a loud then a quiet sound (same speed). "Which was loud?"	Shows or says the loud one.
5	Teacher plays a fast then a slow sound (same loudness). "Which was fast?"	Shows or says the fast one.

Record "yes", "with help" or "not yet" for each part. A child who shows the skill in their own way (for example with a partner pressing for them in part 2, or by feeling the drum in parts 4 and 5) is recorded "yes", with a note of how. "With help" means an adult helped with the idea itself. In part 1, the check is which two colours went in, not the name of the new colour.

Vocabulary

storm, louder, quieter, faster, slower, gallery

Differentiation

- **Support:** in the story, a child chooses just one sound to make (the thunder, or the drips).
- **Stretch:** children make their own short sound story with two changes.

⚠ Safety

- Keep thunder short; offer ear defenders. Gallery walk at walking pace; no touching others' work unless the maker says yes.

Teacher notes

- Children marked "not yet" for loud/quiet or fast/slow can keep practising with the hand-sign game for a minute on other days.
- Keep a few pieces for the term 3 class exhibition.

Kindergarten Arts: Acting Out a Story, a Class Exhibition and a Song Share (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 9 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check movement, performance and photo rules against your school's policies. Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the arts progression | Kindergarten year plan | Term 2 arts unit

Big idea

Actors use their bodies, faces and voices to tell a story, and a still "freeze frame" can show a moment as clearly as a picture. Artists choose which of their work to show and say something about it. A class can share what it has made and learned with visitors: a short play, an exhibition and a song.

This is the third arts unit of the kindergarten year (term 3). It uses term 1's steady beat and singing with actions, and the paintings, prints and collages kept from terms 1 and 2. The story is the folk tale The Enormous Turnip (also called The Gigantic Turnip), retold in this unit's own words.

Outcomes

By the end of the unit a student can:

1. Make a still "freeze frame" with their body on a signal and hold it for a few seconds (for example a tall tree or a tiny mouse).
2. Show a character by how they move (for example a slow old grandfather, a quick little mouse).
3. Retell or put in order the beginning, middle and end of a short story using three picture cards.
4. Take part in acting the story with simple props, joining in the repeated line or doing the actions.
5. Choose one of their own artworks for a class exhibition and say (or show) one thing about it.
6. Sing, sign or do the actions for a song with the class, keeping roughly to the beat.

Prior knowledge

- Term 1 arts: singing songs with actions, keeping a steady beat, stopping on a signal.
- Term 2 arts: loud and quiet, fast and slow; paintings, prints and collages (some kept for this exhibition, as the term 2 unit suggests).
- Health and PE: moving safely in a shared space and stopping on a signal.

Lessons

Lessons are short (20-25 minutes). Lesson 5 is the share; plan it for a time when visitors (another class, or families if your school invites them) can come. Visitors are optional; the share works with just the class.

Lesson	Title	Main activity
1	Freeze! Statues and still pictures	Make body shapes and freeze frames on a signal; move like different characters
2	The Enormous Turnip	Listen to the story, join in the repeated line, put three picture cards in order
3	Acting the story	Act the story with simple props: everyone has a part
4	Getting ready to share	Choose a piece for the exhibition and make a label; learn the turnip song
5	Our share: play, song and exhibition	Perform for visitors (or the class), walk the exhibition, end-of-unit check

Materials (whole class unless noted)

- A clear space (hall or cleared classroom) for lessons 1, 3 and 5.
- A hand drum or tambourine for start and freeze signals, plus a visual signal (a raised hand or a "freeze" card with a picture of a statue).
- The story text (in lesson 2).
- Three story picture cards per pair, drawn by the teacher or printed: 1 a grandfather planting a seed; 2 a line of people and animals pulling on big leaves; 3 everyone sitting on the ground with a huge turnip. Plus one large set for the teacher.
- A "turnip" prop: a big cushion, a bag stuffed with paper, or a large ball in a pillowcase, with green paper or fabric leaves taped on top. It sits in a hoop or a box (the "ground"). Never use a child as the turnip.
- Simple role props (optional): a scarf or shawl for the grandmother, a hat for the grandfather, a hair ribbon or headband for the granddaughter, paper ears on headbands for the dog, cat and mouse, a watering can (empty) and a toy bowl. Name cards with a picture for each role.
- Children's kept artwork from terms 1 and 2, plus one new piece if they want to make one.
- Label cards (about 10 cm × 15 cm), one per child, folded to stand up; crayons or pencils.
- Optional: masking tape or tables for the exhibition, and a sign "Our Class Exhibition" made with the children.

Assessment

- Lessons 1-4: the teacher notes during activities who freezes on the signal, who shows a character by moving, who joins the repeated line or actions, and who chooses a piece and says something about it (observe; no writing needed).
- Lesson 2: a closing check with the three picture cards.
- Lesson 5: a 5-part show-and-talk check with an answer guide (about 3 minutes per child). Plan extra small-group or one-to-one slots in the week; 25 minutes is not enough for the whole class.

⚠ Access and safety

- **Performing is opt-in.** Every child has a part, but parts include narrator's helper (holding up the picture cards), sound maker (drum beat for the "pull"), prop keeper and audience leader (starting the clapping). A child who does not want to be watched can do the actions from their seat with the class. Nobody is made to speak alone in front of visitors.
- **Pulling is pretend.** In the story line, children rest a hand lightly on the shoulder of the child in front (or hold a scarf between them) and pretend to pull. Nobody pulls another child or their clothes. At "POP!" everyone sits down slowly on the count of three, not falling backwards. Leave space between the line and walls or furniture.
- Wheelchair users and children who move differently can play any role; the pull can be shown with arms only, and "sitting down" can be leaning back. Grandfather, grandmother and mouse can all be played seated.
- Children who do not speak, or not yet in the class language, can join the repeated line by signing, using a device or doing the pulling action. Any clear way counts.
- Deaf or hard of hearing children: use the visual freeze card or raised hand alongside the drum, face the class when telling the story, and show the picture card for each new helper. Learn a sign for "pull" from your local sign language if a child uses one.
- Low vision: let children feel the turnip prop and role props before the story; describe each picture card aloud; keep the acting space clear of trip hazards.
- Some children find visitors, clapping or loud singing overwhelming. Offer ear defenders, a quieter spot at the edge, and a "helper" job; keep the share short.
- **Photos and visitors:** follow your school's rules on photographs and visitors. Do not share photos of children's faces unless the school has permission. Visitors are a choice for the school; never ask families to attend, and do not single out children whose families are not there.

Sources

Read for this unit (Wikipedia, 9 November 2026):

- "The Gigantic Turnip": https://en.wikipedia.org/wiki/The_Gigantic_Turnip Used for: it is a cumulative Russian folk tale (ATU 2044, "Pulling up the turnip"), published by Alexander Afanasyev in 1863; a grandfather plants a turnip that grows too big to pull up, and one helper after another joins until they pull it up together; the popular version ends with the mouse. The order of helpers varies between versions. The retelling in lesson 2 is this unit's own wording (CC0), not a copy of any published picture book.
- "Cumulative tale": https://en.wikipedia.org/wiki/Cumulative_tale Used for: in a cumulative (chain) tale the action or words repeat and build up, and the predictable structure has been used with young children. This is why the unit leans on the repeated line.
- "Tableau vivant": https://en.wikipedia.org/wiki/Tableau_vivant Used for: a "living picture" is a still, silent scene made by people posing; performers in theatre sometimes briefly freeze for this effect. The unit calls it a "freeze frame" and does not teach the French term.
- "Here We Go Round the Mulberry Bush": https://en.wikipedia.org/wiki/Here_We_Go_Round_the_Mulberry_Bush Used for: a traditional English nursery rhyme and singing game ("This is the way we..."), first recorded in the mid-nineteenth century, whose tune is also used for other songs. The turnip song in lesson 4 uses this traditional tune with new words written for this unit (CC0).

- "Exhibition": https://en.wikipedia.org/wiki/Exhibition Used for: an exhibition is an organised display of a selection of items, and someone (a curator) chooses what goes in. Children act as their own curators by choosing one piece.
- This repository's arts progression and the kindergarten year plan term 3 arts cell.

Known gaps

- No official arts or drama standard was read for this unit; the content comes from the arts progression and the kindergarten year plan, which are drafts.
- The story is a Russian folk tale. The year plan says "a familiar story"; if children already know a different public-domain or school-owned story, use that instead. Avoid acting recent copyrighted picture books or films without permission. The roles in the retelling (grandfather, grandmother, granddaughter, dog, cat, mouse) can be changed to suit the class.
- No book or published recording is required. Teachers who want a tune reference can sing any traditional version of the Mulberry Bush tune.
- Dance appears only as moving like characters; there is no dance unit yet.
- Peer check: Gemini 4 Argon did a bounded text check at 5c3db56 (timings, pitch, safety, access and story/key consistency; not an educator, classroom or safety review): timings sum and no errors were found; its three small notes (lesson 5 closing choices should point to the turnip prop, drum or exhibition sign rather than helper cards; say how outcome 4 is recorded; list a granddaughter prop) were folded in at 2afcb2c, which Argon also diff-checked the same day (see PEERCHECKS.md).

Lesson 1: Freeze! Statues and still pictures

Goal: Children make body shapes and hold a still "freeze frame" on a signal, and show different characters by how they move.

Length: about 20 minutes.

Materials

- A clear space.
- A hand drum or tambourine, and the visual freeze card (or a raised hand).

Steps

✎ Opening (3 min)

Sit in a circle. "Actors tell stories with their bodies. Today we'll be statues. When the drum plays, you move. When it stops and I hold up the freeze card, you freeze, like a statue, as still as you can."

Practise twice on the spot: wiggle fingers while the drum plays, freeze when it stops.

✎ Main activity 1: freeze shapes (5 min)

Children find a space ("your own bubble", as in health and PE). The drum plays; children walk (or wheel, or move arms) around the space. Drum stops, card up, teacher calls a shape:

1. "Freeze... as a tall tree!"
2. "Freeze... as a tiny mouse!"
3. "Freeze... as a big round ball!"
4. "Freeze... as if you are pulling something very heavy!"

Count slowly "one, two, three" while children hold each shape, then "relax". Point out two or three different freezes: "Look, Amir is a tree with arms up, and Lena is a tree with arms out like branches. Both are trees."

✎ Main activity 2: move like a character (5 min)

The drum plays at different speeds to match each character. Children move like:

- an old grandfather, walking slowly with a stick (slow drum);
- a busy dog, trotting and sniffing (medium drum);
- a cat, stretching and creeping (slow, quiet drum);
- a little mouse, scurrying (fast, quiet drum).

After each, freeze on the signal and hold for three.

✓ Discussion questions (with answers) (4 min)

- "How did you show the mouse was little?" (Any answer about the body: made myself small, curled up, tiny steps, fast quiet feet.)
- "How did you move for the old grandfather?" (Slowly; leaning on a pretend stick; small careful steps. Any slow, careful movement fits.)
- "Can two people make the same thing in different ways?" (Yes: both trees were trees even though they looked different.)

✓ Closing check (with answers) (3 min)

One last freeze: "Freeze as the grandfather pulling something heavy!" Then "freeze as the mouse." Watch for:

- stopping on the signal and holding still for about three seconds;
- a big, heavy shape for pulling and a small shape for the mouse (any small shape counts).

Vocabulary

freeze, statue, still, character, actor

Differentiation

- **Support:** a child copies the teacher's freeze, or freezes just their hands or face.
- **Stretch:** pairs make a freeze together (one is the grandfather, one is the turnip leaves he is pulling).

⚠ Safety

- Walking pace only; no running. Remind children to keep their bubble and watch for others when moving.
- Heavy-pulling freezes are pretend: lean, do not pull on anyone.

Teacher notes

- Children who find standing still hard can freeze sitting down, or hold a "statue" with just one hand. A shorter freeze still counts.
- Seated and wheelchair users can make every shape with upper body, arms and face; describe shapes so that any body can make them ("make yourself tall", not "stand on tiptoe").
- Keep the four characters: they appear in the story in lesson 2.

Lesson 2: The Enormous Turnip

Goal: Children listen to a cumulative folk tale, join in the repeated line, and put three picture cards in order (beginning, middle, end).

Length: about 25 minutes.

Materials

- The story text below.
- Large picture cards for the teacher, one for each helper (grandfather, grandmother, granddaughter, dog, cat, mouse) and three story cards (planting, pulling, everyone on the ground with the turnip).
- Three story cards per pair, shuffled.
- The turnip prop (optional in this lesson; to show the size).

Steps

✎ Opening (3 min)

"Today's story is very old. People have told it for a long time, in many countries, and it is the same story every time with one more helper. Listen for the part that keeps coming back, and say it with me."

Teach the repeated line with a pulling action (both hands pulling towards the chest):

> They pulled and they pulled, but the turnip would not come up!

✎ Main activity: tell the story twice (12 min)

Tell the story slowly, holding up each helper's card as they arrive. Children join in the repeated line and the pulling action. Tell it a second time: this time children say who comes next before you show the card.

The Enormous Turnip (a retelling of a traditional folk tale; this wording is CC0):

> Once upon a time, a grandfather planted a turnip seed. "Grow, little turnip," he said. "Grow sweet, grow strong."
>
> The turnip grew, and grew, and grew, until it was ENORMOUS.
>
> Grandfather took hold of the leaves. They pulled and they pulled, but the turnip would not come up! (Only Grandfather is pulling, but the line is the same every time.)
>
> So Grandfather called Grandmother. Grandmother held on to Grandfather, and Grandfather held the leaves. They pulled and they pulled, but the turnip would not come up!

So Grandmother called the granddaughter. The granddaughter held on to Grandmother, Grandmother held on to Grandfather, and Grandfather held the leaves. They pulled and they pulled, but the turnip would not come up!

So the granddaughter called the dog. The dog held on to the granddaughter, the granddaughter held on to Grandmother, Grandmother held on to Grandfather, and Grandfather held the leaves. They pulled and they pulled, but the turnip would not come up!

So the dog called the cat. The cat held on to the dog, the dog held on to the granddaughter, the granddaughter held on to Grandmother, Grandmother held on to Grandfather, and Grandfather held the leaves. They pulled and they pulled, but the turnip would not come up!

So the cat called the little mouse. The mouse held on to the cat, the cat held on to the dog, the dog held on to the granddaughter, the granddaughter held on to Grandmother, Grandmother held on to Grandfather, and Grandfather held the leaves. They pulled and they pulled, and they pulled and they pulled, and...

POP! Up came the turnip, and everyone sat down with a bump.

That night they made turnip soup, and everyone had a bowl, even the little mouse.

✓ Discussion questions (with answers) (5 min)

- "Who planted the turnip?" (The grandfather.)
- "Why couldn't Grandfather pull it up on his own?" (It was too big / enormous.)
- "Who was the last helper?" (The mouse.)
- "Did the mouse pull it up all by herself?" (No: everyone pulled together; the mouse was the last one to join. Accept "everyone" or "they all did".)
- "What part kept coming back?" (They pulled and they pulled, but the turnip would not come up.)

✓ Closing check (with answers) (5 min)

Pairs get the three shuffled story cards: "Put them in order: what happened first, next and last?" Then each pair points to the cards in order while the teacher walks round.

Answer: **1** Grandfather plants the seed; **2** everyone pulls on the leaves; **3** everyone sits on the ground with the turnip.

Note who places them in order without help. A child who tells the story in order without the cards (or points to helpers' cards in order) has also met the goal.

Vocabulary

turnip, enormous, pull, beginning, middle, end, helper

Differentiation

- **Support:** use only two cards (planting and turnip out: which came first?).
- **Stretch:** put the six helper cards in the order they came.

⚠ Safety

- Pulling actions are on your own, towards your chest; no pulling on others in this lesson.

Teacher notes

- Some versions of the tale have different helpers or a different order; it is fine if a child knows another version. "In our story, the mouse came last."
- Leave the helper cards on display; they are used for casting in lesson 3.
- The story's "everyone sat down with a bump" becomes a slow, counted sit-down when it is acted (lesson 3).

Lesson 3: Acting the story

Goal: Children act The Enormous Turnip with simple props, each with a part, joining in the repeated line and the pretend pull.

Length: about 25 minutes.

Materials

- A clear space, with the "ground" (hoop or box) and the turnip prop at one end, at least a metre from any wall.
- Role props and picture name cards (grandfather, grandmother, granddaughter, dog, cat, mouse); a scarf for each child in the pulling line (optional).
- The helper cards from lesson 2 and the hand drum.
- An empty watering can and a toy bowl (optional).

Steps

✎ Opening (3 min)

"Today we're going to be the story. The teacher tells it; the actors show it. Everybody has a job." Show the jobs with their picture cards:

- **Actors:** grandfather, grandmother, granddaughter, dog, cat, mouse.
- **Turnip growers:** everyone else, sitting round the ground; they grow the turnip with their hands (low to high) and say the repeated line.
- **Card holder:** holds up each helper card as they are called.
- **Drummer:** plays one beat on each "pulled".

✎ Main activity: act it three times (15 min)

Before the first run, practise the safe pull and the slow sit (2 min). Each child rests one hand lightly on the shoulder of the person in front (or holds a scarf between them). On "pulled", everyone leans back a little, with feet still. At "POP!" the teacher counts "one, two, three" and everyone sits down slowly. Nobody pulls anyone, and nobody falls.

Run 1 (about 4 min): the teacher tells the story (from lesson 2) and plays the grandfather; children take the other roles. The growers make the turnip grow and say the line.

Run 2 (about 4 min): new children take the roles; growers become actors and actors become growers, card holder and drummer.

Run 3 (about 5 min): the same, with new children in roles. If time is short, cut to two runs; every child should have had a turn in a role they chose (an actor role, a helper job, or growing).

During each run, praise acting choices: "The mouse is scurrying so quickly!" "Grandmother is walking slowly and carefully."

✓ Discussion questions (with answers) (4 min)

- "How did the actors show the turnip was heavy?" (Leaning back, puffing cheeks, slow pulls, strong faces. Any body or face idea counts.)
- "How did the mouse actor show she was little?" (Small shape, quick small steps, a quiet squeaky voice. Any small-and-quick idea counts.)
- "How did we keep everybody safe when we pulled?" (Hands resting lightly, pretend pulling, sitting down slowly on three.)

Closing (3 min)

Finish with a whole-class freeze frame of the last moment: everyone sitting, looking at the enormous turnip. Hold for three. "That's the picture we'll end with when we share it."

Vocabulary

act, actor, role, prop, audience, turn

Differentiation

- **Support:** a child plays a role alongside an adult or a friend (two mice are fine), or chooses a growing or drumming job.
- **Stretch:** a child adds a line for their character ("Woof! I'll help!"), or a group makes up a new helper for the end (a bird? a worm?).

⚠ Safety

- Pretend pulling only, hands resting lightly or holding a scarf; nobody pulls a child or their clothes.
- Everyone sits down slowly on the count of three; nobody falls backwards.
- Keep the line away from walls and furniture; walking pace.
- The turnip is always a prop, never a child.

Teacher notes

- Children who do not want to be watched can be growers or the drummer; nobody has to act in front of others.
- Seated and wheelchair users can play any role: the pull is shown with arms, and "sitting down" can be leaning back. A child using a wheelchair in the line can hold a scarf rather than a shoulder.
- Children who do not speak can say the repeated line by signing or with a device, or do the pulling action; joining by action counts as joining in.
- If the class wants a different ending order (cat before dog), that is fine; folk tales vary.
- Note who moves in character and who joins the line or actions.

Lesson 4: Getting ready to share

Goal: Each child chooses one of their artworks for the class exhibition, makes a label for it, and learns the turnip song with actions.

Length: about 25 minutes.

Materials

- Children's kept artwork from terms 1 and 2 (drawings, colour mixes, prints, collages), each child's pieces in a folder or pile.
- One folded label card per child; crayons or pencils.
- The hand drum.

Steps

✎ Opening (3 min)

"In a museum or gallery, someone chooses which pictures to show. That person is called a curator. Today you are your own curator: you choose one piece of your art to show our visitors."

✎ Main activity 1: choose and label (10 min)

Each child looks through their own pieces and chooses one. The teacher (or a helper) asks each child, quietly: "Why did you choose this one?" and writes the child's words on the label, or the child draws or makes their own mark. A label has:

- the child's name (written by the child if they can, or by an adult);
- one thing the child says about it ("I mixed blue and yellow", "This is my bird", "I like the bumpy bit").

Any reason is a good reason ("I like it", "it's red" are fine). A child who does not want to choose can pick two and the teacher holds them up: "This one or this one?"; pointing counts.

✎ Main activity 2: learn the turnip song (8 min)

The song uses the traditional tune of "Here We Go Round the Mulberry Bush" ("This is the way we..."), with new words written for this unit (CC0). Sing each verse once for the children, then together, with actions. Keep a steady beat on the drum or knees, as in term 1.

> This is the way we plant the seed,
> Plant the seed, plant the seed.
> This is the way we plant the seed,
> So early in the morning.
> (Action: push a finger into the "ground".)

This is the way we water it,
Water it, water it.
This is the way we water it,
So early in the morning.
(Action: wiggle fingers like rain from a watering can.)

This is the way the turnip grows,
Turnip grows, turnip grows.
This is the way the turnip grows,
So early in the morning.
(Action: hands start low and rise up slowly into a big round shape.)

This is the way we pull and pull,
Pull and pull, pull and pull.
This is the way we pull and pull,
So early in the morning.
(Action: pull towards your chest on each "pull".)

This is the way we eat our soup,
Eat our soup, eat our soup.
This is the way we eat our soup,
And then we have our supper.
(Action: pretend spoon from bowl to mouth.)

If five verses are too many, sing verses 1, 4 and 5.

Closing (4 min)

Sing the song once more with actions. Then: "Who can show me the action for 'pull and pull'?" and "Which verse came last?" (Answer: eating the soup.)

Vocabulary

curator, exhibition, label, choose, verse

Differentiation

- **Support:** a child joins the actions only, or sings just the "pull and pull" part.
- **Stretch:** a child invents a new verse and action ("This is the way the mouse runs in").

⚠ Safety

- Handle others' artwork only with the maker's say-so. Keep wet or fragile pieces flat.

Teacher notes

- Children who missed earlier units or have nothing kept can make a quick new drawing of a turnip character for the exhibition in this lesson.
- Write labels in the child's own words; do not correct "I like it" into something grander.

- Singing can be signing, humming or doing the actions; all count as joining in. Keep the volume comfortable for children who find loud group singing hard.
- If your class knows a different "This is the way" song, keep this tune; only the words are new.

Lesson 5: Our share: play, song and exhibition

Goal: The class shares its play, song and exhibition with visitors (or with each other), and children show what they learned in the end-of-unit check.

Length: about 25 minutes, plus one-to-one check time.

Materials

- The acting space with the turnip prop, role props and helper cards.
- The exhibition: each child's chosen piece with its standing label, laid on tables or taped at child height; the "Our Class Exhibition" sign.
- The hand drum and visual freeze card.
- For the check: the three story cards (shuffled) and the child's exhibition piece.
- A class list for recording "yes", "with help" or "not yet".

Steps

✎ Opening (3 min)

Welcome visitors if any. A child (or the teacher) says: "Welcome to our share. We will act a story, sing a song, and show you our exhibition." Visitors sit as the audience. Without visitors, half the class is the audience for the play and they swap for the song.

✎ Main activity 1: the play (8 min)

Act The Enormous Turnip once, as in lesson 3, with roles chosen by the children beforehand. The audience is invited to join the repeated line ("They pulled and they pulled..."). End on the freeze frame of everyone sitting with the turnip; hold for three, then bow (or wave).

✎ Main activity 2: the song (4 min)

Everyone sings the turnip song from lesson 4 with actions. Visitors can join in the actions.

✎ Main activity 3: exhibition walk (6 min)

Visitors and children walk round the exhibition at walking pace. Children who want to can stand by their piece and tell a visitor one thing about it; others can walk round with a friend. The label speaks for children who prefer not to talk.

Closing (4 min)

Back in a circle: "What did you like best: the play, the song or the exhibition?" Each child points to the turnip prop (the play), the drum (the song) or the exhibition sign (the exhibition), sings a line, or says a word. Thank the visitors.

✓ End-of-unit check (one-to-one or in a small group)

About 3 minutes per child, at a calm time after the share (not in front of visitors). Any child may show in their own way (pointing, signing, using a device, moving, humming).

Part	Ask or watch	Looking for
1	Drum plays, then stops with the freeze card: "Freeze as a tiny mouse!"	Stops on the signal and holds a still shape for about three seconds (any small shape).
2	"Show me how the old grandfather walks."	Moves differently from their usual walk to show the character (slow, careful, or with a pretend stick).
3	Give the three shuffled story cards: "Put them in order: first, next, last."	Planting, then pulling, then everyone on the ground with the turnip.
4	"In our story, who was the last helper?"	The mouse. (If the class acted a version with a different last helper, accept that one.)
5	Point to their exhibition piece: "Tell me about this one." Then: "Can you do the 'pull and pull' part of our song?"	Says, signs or points to one thing about their piece; sings, hums, signs or does the pulling action roughly in time.

Record "yes", "with help" or "not yet" for each part. A child who shows the skill in their own way (for example freezing seated, showing the grandfather with arms only, or joining the song by action) is recorded "yes", with a note of how. "With help" means an adult helped with the idea itself (for example modelling the freeze or placing the first card). Part 5 does not judge singing in tune; joining the action roughly with the beat is enough.

Outcome 4 (taking part in acting the story) is not a part of this check: record it from what the teacher saw in lessons 3 and 5 (joined the repeated line, the actions or a helper job, in any way).

Vocabulary

share, audience, bow, exhibition, visitor

Differentiation

- **Support:** a child takes a helper job in the play (card holder, drummer) and stands by their piece with a friend.
- **Stretch:** a child welcomes the visitors, or explains the exhibition sign.

⚠ Safety

- Pretend pulling and the slow sit-down on three, as in lesson 3.
- Walking pace in the exhibition; look with eyes, not hands, unless the maker says yes.
- Follow school rules on visitors and photos; do not share photos of children's faces without the school's permission.

Teacher notes

- Nobody is made to perform or speak in front of visitors. A child who is overwhelmed can watch from a quiet spot with ear defenders, or help with props.
- If families are invited, do not single out children whose families did not come; every child's work is shown and every child is welcomed by the class.
- After the share, children can take their exhibition piece home, or the class can keep the exhibition up for a week.
- This is the last arts unit of the kindergarten year. Grade 1 arts will build on freeze frames, moving in character, retelling in order, and choosing and talking about one's own work.

Grade 1 Arts: Drawing from Looking: Shapes, Rubbings, Light and Dark (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 9 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check materials and objects against your school's rules and the class allergy list.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the arts progression | Grade 1 year plan - Term 1

Big idea

Artists look before they draw, and keep looking while they draw. Things we see can be broken into simple shapes, edges, textures and patches of light and dark. Noticing these helps children draw what is really there, not only what they think something looks like.

This is the first arts unit of the grade 1 year (term 1). In kindergarten children named kinds of line and drew a real object by looking (kindergarten term 1). Term 2 of grade 1 moves on to rhythm and pitch, and term 3 to a puppet story.

Outcomes

By the end of the unit a student can:

1. Find at least two simple shapes (circle, square, rectangle, triangle, oval) inside a real object and use them to start a drawing.
2. Draw the outside edge (outline) of a real object while looking at it more than at the paper.
3. Make a rubbing of a textured surface and match at least two rubbings to the surfaces that made them, using a texture word (bumpy, smooth, rough, stripy, wavy).
4. Make light marks and dark marks on purpose (by pressing gently or harder, or by putting lines further apart or closer together), and point to the lighter side and the darker side of an object lit from one side.
5. Say one thing they like about a classmate's drawing and why ("I like... because...").

Prior knowledge

- From kindergarten arts: names of kinds of line (straight, wavy, zigzag); colour names; drawing one real object by looking.
- From kindergarten maths: naming circles, squares, triangles and rectangles (the term 1 quick check covers children who missed this).
- Some children still find a pencil hard to control; chunky pencils, thick crayons and big paper help, and the unit always offers another way to show what they noticed.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week. Lesson 3 may use a short walk around the classroom or school grounds with adults.

Lesson	Title	Main activity
1	Shapes hiding in things	Find shapes inside real objects, then draw an object starting with its shapes
2	Following the edge	Trace an object's edge with a finger, then draw its outline while looking at it
3	Rubbings and textures	Make crayon rubbings of textured surfaces and play a match-the-rubbing game
4	Light and dark	Make a light-to-dark strip, see the lit side and shadow side of a ball, and shade a drawing
5	My looking drawing	Draw one object using shapes, edges, texture and light and dark; share in a class gallery

Materials (whole class unless noted)

- Lesson 1: per table, a "looking tray" with 4 everyday objects that are safe to handle (for example a plastic mug, a toy car, a wooden block, an apple or plastic apple, a cardboard tube, a small box); per child, a set of 5 shape cards (circle, square, rectangle, triangle, oval) each with its shape drawn in a thick black outline; plain paper (A4 or larger), chunky pencils and crayons; a large picture of a house made only of shapes for the opening; a board or large paper for modelling; the closing-check object (an alarm clock or a picture of one).
- Lesson 2: per child, one natural or everyday object with an interesting edge (a leaf, a shell with no sharp broken edge, a large key, a pine cone, a peg); a card "window" viewfinder (a piece of card with a hole about 5 cm square); plain paper; chunky pencils or thick black felt pens; a large leaf or a picture of one for the opening; the two closing-check drawings (a quick outline of a mug and a scribble that does not follow an edge).
- Lesson 3: per child, thin paper (copy paper or newsprint) and a peeled wax crayon (paper wrapper taken off) or a chunky crayon used on its side; masking tape to hold paper still; a set of textured things to rub (for example corrugated card, a leaf, a plastic mesh or sieve, a bumpy shoe sole, a doormat, a tree bark or brick wall outdoors, a woven placemat, bubble wrap); per pair, a match-the-rubbing set (4 rubbings made in advance and the 4 objects that made them); a large card of texture words (bumpy, smooth, rough, stripy, wavy) with a small picture for each; the closing-check pair (a rubbing of corrugated card, plus the corrugated card and a smooth plastic lid).
- Lesson 4: per child, a strip of paper with 4 boxes and a soft pencil (2B or 4B if you have them, or an ordinary pencil); plain paper; a ball or an orange per table (or one ball for the whole class); a torch or desk lamp; a way to dim the room (blinds down or lights off near one table); a large example strip from very light to very dark for the opening; a few 2-box strips and soft crayons for support; the lesson 1 looking trays for early finishers; the closing-check picture (a ball drawn lit from the left with its dark side on the right).
- Lesson 5: per child, plain paper (A4 or larger), chunky pencils, soft pencils and crayons; their own rubbings from lesson 3 and glue sticks (optional, to add a textured background); the looking trays from lesson 1 and the lesson 2 objects for children to choose from; a torch or desk lamp for any table that wants a clear light side; sticky notes or small cards with "I like... because..." printed on them; Blu Tack or pegs for a class gallery; for the one-to-one

check during the week: a plastic mug, the corrugated-card rubbing and a leaf rubbing with the corrugated card and the leaf, a scrap of paper and a pencil, and a ball with a torch.
- Every lesson: chunky pencils and thick crayons; pencil grips; thick black felt pens for children who see high contrast best; tape to hold paper still.
- Support and access, in the lessons that use them: card shape templates (circle, square, rectangle, triangle, oval) to draw round (lessons 1 and 5); glue sticks or wax sticks and a rubber mat or newspaper stack for raised-line drawing (lessons 2, 4 and 5); soap and water or wipes after rubbing outside (lesson 3); child-safe scissors to cut rubbings (lesson 5); picture cards (a shape, an edge, a rubbing, a light/dark strip) for children who answer by pointing (lesson 5); a leaf rubbing made in advance for the lesson 3 opening; a few block crayons and a second crayon colour per child (lesson 3 support and extension).

Assessment

- Lessons 1-4: the teacher notes answers in the closing checks (observe; no writing needed). Children can answer by speaking, signing, pointing or choosing a card.
- Lesson 5: look at the finished drawing with the child. Notice which of the four things they used (shapes, an edge drawn while looking, texture, light and dark). Drawings are not marked for "neatness" or likeness.
- **One-to-one check (about 4 minutes per child, during the week of lesson 5):**
    1. Show a plastic mug. "What shapes can you see in the mug?" (Any two reasonable shapes, for example a circle or oval at the top, a rectangle for the side, a curved shape or a "C" for the handle.)
    2. Show the corrugated-card rubbing and the leaf rubbing, with the corrugated card and the leaf. "Which thing made which rubbing?" (The stripes came from the corrugated card; the lines like branches came from the leaf's veins.)
    3. "Show me a light mark and a dark mark." (A gentle mark and a harder mark, or lines far apart and close together; any clear difference counts.)
    4. Shine a torch on a ball from one side. "Point to the darker side." (The side away from the torch.)
    5. "When you draw something real, where do your eyes go?" (Mostly at the thing, with quick looks at the paper; any answer that includes looking at the object counts.)
- Record each item as "yes / with help / not yet". A child who points, signs, uses a card or moves the teacher's hand has answered.

⚠ Safety (read before lesson 1)

- Objects: nothing sharp, glass, or small enough to swallow for children who still mouth objects; check shells and pine cones for sharp bits.
- Food: if real fruit is used, check the class allergy list; plastic fruit is fine. Children do not eat the objects.
- Torches and lamps: shine at the object, never into anyone's eyes. Use an ordinary torch or desk lamp only; no lasers. Keep lamp cables tidy and let an adult move lamps (they can get warm).
- Rubbings outside: stay with an adult, only rub surfaces at a safe height, avoid anything hot, sharp, dirty or with insects, and wash hands after.
- Pencils: carry them point down and keep them away from faces.

Access and taking part

- **Low vision:** high-contrast objects on a plain dark or light cloth; thick black felt pens; bigger paper; let children touch and hold the object as long as they want. Rubbings are a good tactile route: children can feel the texture and then feel the wax bumps on the paper.
- **Blind children:** feel the object, then make a raised-line drawing (on paper over a rubber mat, or with wax sticks or glue lines that dry raised) or build the shapes from card cut-outs. Light and dark can be explored as gentle and strong marks: pressing hard on paper over a rubber mat makes deeper grooves that can be felt.
- **Fine-motor needs:** chunky pencils, grips, fist grip is fine, taped-down paper, card shape templates to draw round, or the child tells or points and an adult or partner draws exactly what they say.
- **Non-speaking children and children who sign:** answer by pointing to cards, signing, or choosing from two options.
- **Deaf children:** show each step (demonstrate before talking), and use a visual "pencils down" signal.
- No child has to show their drawing in the gallery; showing it to the teacher only is fine. A drawing that does not "look like" the object still counts if the child can say or show what they looked at.

Sources

Read for this unit (Wikipedia, 9 November 2026):

- "Rubbing (art)" (the page for frottage): https://en.wikipedia.org/wiki/Frottage_(art) Used for: a rubbing copies the texture of a surface by putting paper over it and rubbing it with something that leaves marks, most often charcoal or pencil, but also wax, chalk and other materials. Lesson 3 uses wax crayons.
- "Contour drawing": https://en.wikipedia.org/wiki/Contour_drawing Used for: contour drawing is drawing the outline of a subject, focusing on its outlined shape rather than small details ("contour" is French for "outline"). Lesson 2 calls this "following the edge".
- "Hatching": https://en.wikipedia.org/wiki/Hatching Used for: hatching makes tone or shading with closely spaced parallel lines; lines at an angle to each other are cross-hatching. Lesson 4 uses "lines close together look darker" and does not teach the word.
- "Chiaroscuro": https://en.wikipedia.org/wiki/Chiaroscuro Used for: artists use contrasts of light and dark to give a sense of volume to three-dimensional objects. Lesson 4 uses this idea (a lit side and a shadow side) without the term.
- "Still life": https://en.wikipedia.org/wiki/Still_life Used for: a still life shows mostly everyday objects, natural (fruit, flowers, shells, rocks) or human-made (cups, books). The looking trays are small still-life set-ups.
- This repository's arts progression and the grade 1 year plan term 1 arts cell.

Known gaps and cautions

- No official arts standard was read for this unit; the content comes from the grade 1 year plan and the arts progression, which are drafts.
- The arts progression's grade 1 line lists colour mixing, printing and pattern; this year plan puts drawing from looking in term 1 instead, because mixing and printing were taught in kindergarten term 2. Rubbings in lesson 3 keep a link to pattern.
- Music, drama and dance are not in this unit; they come in grade 1 terms 2 and 3.

- "Shapes inside things" is a way to start a drawing, not the only way. Some children draw well by following the edge straight away; let them.
- Pacing and vocabulary load are untested estimates; a qualified local educator should review the unit before classroom use.
- Gemini 4 Argon text-checked the README and lessons 1-5 at 4e851c7 on 9 November 2026 (timings, links, counts, answer keys, the one-to-one check, safety and access routes were consistent); two lesson 4 materials notes were fixed in c2f71db, which Argon also diff-checked the same day (see PEERCHECKS.md). This is a peer check by an AI agent, not an educator review.
- The order of lessons, the activities and the timings are my choice, not taken from a source.

Lesson 1: Shapes hiding in things

Unit overview - Next: Lesson 2

Goal: Children find simple shapes inside real objects and use those shapes to start a drawing of one object.

Length: about 40 minutes.

Materials

- Per table: a "looking tray" with 4 everyday objects that are safe to handle (for example a plastic mug, a toy car, a wooden block, an apple or plastic apple, a cardboard tube, a small box).
- Per child: a set of 5 shape cards (circle, square, rectangle, triangle, oval), each shape drawn with a thick black outline.
- Plain paper (A4 or larger), chunky pencils, pencil grips and crayons; thick black felt pens; tape to hold paper still.
- Card shape templates (circle, square, rectangle, triangle, oval) to draw round, for support.
- A large picture of a house made only of shapes (a square, a triangle roof, rectangle door and windows, a circle sun) for the opening.
- A board or large sheet of paper for modelling the mug drawing.
- For the closing check: an alarm clock (or a picture of one).

Steps

✎ Opening (5 min)

Show the shape house. "What shapes can you find?" Children point to or name a square, a triangle, rectangles and a circle. "Artists have a trick: before they draw something, they look for the shapes hiding inside it."

Hold up the plastic mug. Trace its top in the air with a finger: "The top looks like a circle (or an oval when I tip it). The side looks like a rectangle." Children trace in the air with you.

✎ Main activity (25 min)

1. **Shape hunt (8 min).** At tables, children pick up each object on the looking tray, turn it round, and hold up the shape card that matches a part of it ("The block has a square." "The car wheel is a circle."). There is often more than one right answer; accept any shape a child can point to on the object.
2. **Shapes first (12 min).** Each child chooses one object from the tray and puts it in front of them. Model on the board: draw the mug as a rectangle with an oval on top and a "C" for the handle, looking at the mug between each shape. Then children draw their object, starting with the biggest shape and adding smaller shapes. Remind: "Look at the object, draw one shape, look again."

3. **Add one thing you see (5 min).** Children add one detail they can really see (a stripe, a stalk, a door on the car). They may colour if there is time.

✓ Discussion questions (5 min, with answers)

- "Which shape did you start with, and why?" (Any answer, for example "the biggest shape" or "the body of the car".)
- "Did two people find different shapes in the same object?" (Usually yes: the top of a mug is a circle from above and an oval from the side. Both are right; it depends where you look from.)
- "Is the apple really a circle?" (Not exactly; it is round with bumps and a dip at the top. The circle is a starting shape and then we change it to match what we see.)

✓ Closing check (5 min, with answers)

Hold up the alarm clock (or picture). Each child shows one shape card for a part of it, or points to the part.

- Answers: circle for the face (or oval); rectangle or square for a base; small circles for bells or feet; triangles or thin rectangles for the hands. Accept any shape the child can point to on the clock.

Vocabulary

shape, circle, square, rectangle, triangle, oval, object, look, draw

Differentiation

- Support: give card shape templates to draw round; or the child chooses shape cards and lays them on the paper to "build" the object, then draws round them.
- Extension: draw the same object from a second side (from above or from the side) and say which shapes changed.

⚠ Safety

- Objects on the trays are safe to handle: no glass, nothing sharp, nothing small enough to swallow for children who still mouth objects.
- If real fruit is used, check the class allergy list; nobody eats it.

Teacher notes

- Children often draw the "idea" of an object (a symbol) rather than what is in front of them; that is normal at this age. The shape trick is a bridge, not a test.
- Low vision or blind children can feel each object and lay shape cards (or card cut-outs) on the paper; see the README access section.

Lesson 2: Following the edge

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children draw the outline of a real object while looking at the object more than at the paper.

Length: about 40 minutes.

Materials

- Per child: one object with an interesting edge (a leaf, a shell with no sharp broken edge, a large key, a pine cone or a peg).
- Per child: a card "window" viewfinder (card with a hole about 5 cm square).
- Plain paper, chunky pencils, pencil grips and thick black felt pens; tape to hold paper still.
- A large leaf (or a picture of one) for the opening.
- Glue sticks or wax sticks and a rubber mat (or a stack of newspaper) for raised-line drawing, for children who need a tactile route.
- For the closing check: two drawings prepared in advance, one a quick outline of a mug that follows its edge and one a scribble that does not.

Steps

✎ Opening (5 min)

Hold up the large leaf. "Today we draw the edge, the line where the leaf stops and the air begins." Slowly run a finger round the edge: "Bumpy here, pointy here, a long smooth bit here." Children copy with a finger in the air while watching the leaf.

✎ Main activity (25 min)

1. **Snail fingers (5 min).** Each child takes an object. Using one finger, they move round its edge very slowly, "as slowly as a snail", saying what they feel or see ("bumpy", "pointy", "round").
2. **Snail drawing (10 min).** Children put their pencil on the paper and their eyes on the object. They move the pencil slowly round, as their eyes move round the edge. They may glance at the paper, but most of the looking is at the object. Tell them: "It will look wobbly. Wobbly is good. It means you were looking."
3. **Window drawing (10 min).** Children hold the card window over part of their object (for example the tip of the leaf, the teeth of the key) and draw only what they see in the window, bigger, filling the paper.

✓ Discussion questions (5 min, with answers)

- "What was hard about looking at the object, not the paper?" (Any answer; for example "I wanted to look at my paper." That is normal.)

- "What did you notice on the edge that you hadn't noticed before?" (Any real detail: a tiny bump, a point, a notch.)
- "Why did the window help?" (It shows a small part, so you can see more detail and draw it big.)

✓ Closing check (5 min, with answers)

Show the two prepared drawings. "Which artist was looking at the edge of the mug?" Children point or hold up one or two fingers.

- Answer: the outline that follows the mug's edge (handle, rim, base). The scribble does not follow an edge.

Vocabulary

edge, outline, look, slowly, window, detail

Differentiation

- Support: draw round a flat object first (lay the leaf on the paper and trace it), then try a snail drawing next to it.
- Extension: draw one edge line inside the object too, for example the middle vein of the leaf or the spiral of the shell.

⚠ Safety

- Check shells, pine cones and keys for sharp bits before the lesson.
- Nothing small enough to swallow for children who still mouth objects.

Teacher notes

- Blind or low-vision children can trace the edge with a finger and then make a raised-line drawing: draw with glue or a wax stick, or press hard with a pencil on paper over a rubber mat so the line can be felt.
- Wobbly lines show looking; praise the looking, not the neatness.

Lesson 3: Rubbings and textures

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children make crayon rubbings of textured surfaces, describe them with texture words, and match rubbings to the surfaces that made them.

Length: about 40 minutes.

Materials

- Per child: several sheets of thin paper (copy paper or newsprint) and a peeled wax crayon (paper wrapper taken off) or a chunky crayon used on its side; masking tape to hold paper still.
- A few block crayons (for support) and a second colour of crayon per child (for the extension).
- Textured things to rub (for example corrugated card, leaves, a plastic mesh or sieve, a bumpy shoe sole, a doormat, a woven placemat, bubble wrap); outdoors, a tree bark or brick wall at a safe height.
- Per pair: a match-the-rubbing set (4 rubbings made in advance and the 4 objects that made them).
- A large card of texture words (bumpy, smooth, rough, stripy, wavy) with a small picture for each.
- A rubbing made in advance from a leaf, for the opening.
- For the closing check: a rubbing of corrugated card, plus the corrugated card and a smooth plastic lid.
- Soap and water or wipes for after rubbing outside.

Steps

✎ Opening (5 min)

Show the leaf rubbing without saying what it is. "I didn't draw this. I put paper on top of something and rubbed it with the side of a crayon. What do you think was under the paper?" Take guesses, then show the leaf. "Rubbing lets us see texture, how a surface feels."

Read the texture words card together and feel one example for each word.

✎ Main activity (25 min)

1. **How to rub (3 min).** Demonstrate: tape the paper over the corrugated card, hold the peeled crayon flat on its side, rub gently in one direction. "Gentle and flat, not the point."
2. **Texture hunt (14 min).** Children move round the room (or the playground with adults) and make at least three rubbings of different surfaces. After each one they tell a partner or an adult one texture word for it.

3. **Match the rubbing (8 min).** In pairs, children use the match set: 4 rubbings and 4 objects. They put each rubbing next to the object they think made it, then check by feeling the object and the rubbing.

✓ Discussion questions (5 min, with answers)

- "Which surface made the clearest rubbing?" (Usually bumpy or stripy ones with raised parts, such as corrugated card, a shoe sole or a mesh.)
- "Why does a very smooth surface make an almost plain rubbing?" (There are no bumps to catch the crayon, so it colours evenly.)
- "How did you know which object made which rubbing?" (By matching the pattern: stripes, holes, lines like branches.)

✓ Closing check (5 min, with answers)

Show the corrugated-card rubbing, the corrugated card and the smooth lid. "Which made this rubbing? Tell me one texture word."

- Answer: the corrugated card; the word "stripy" (or "bumpy" or "wavy" for the ridges). The smooth lid would make an almost plain rubbing.

Vocabulary

rubbing, texture, surface, bumpy, smooth, rough, stripy, wavy, pattern

Differentiation

- Support: rub with a partner holding the paper still, or use a block crayon held in the whole hand.
- Extension: make one rubbing with two textures side by side, or rub the same thing in two colours, and say what changed.

⚠ Safety

- Outdoors, stay with an adult; only rub surfaces at a safe height; avoid anything hot, sharp, dirty or with insects on it. Wash hands afterwards.
- Do not rub coins or tiny objects with children who still mouth objects.

Teacher notes

- Keep the rubbings: children can cut them out and use them in lesson 5.
- Rubbings are a strong route for blind and low-vision children: wax crayon leaves slightly raised marks that can be felt, and the texture can be felt first on the object itself.
- Making the match set: rub each object with the same colour so colour does not give the answer away.

Lesson 4: Light and dark

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children make light and dark pencil marks on purpose, see that an object lit from one side has a lighter side and a darker side, and add darker marks to a drawing.

Length: about 40 minutes.

Materials

- Per child: a strip of paper with 4 boxes in a row, and a soft pencil (2B or 4B if you have them, or an ordinary pencil); pencil grips.
- Plain paper; thick black felt pens; tape to hold paper still.
- For support: a few strips with only 2 boxes, and soft crayons.
- The looking trays from lesson 1, for early finishers.
- A ball or an orange per table (or one ball for the whole class).
- A torch or desk lamp per table (or one for the class).
- A way to dim the room (blinds down, or lights off near one table).
- A large example strip going from very light to very dark, for the opening.
- A rubber mat or a stack of newspaper to press on, and glue sticks or wax sticks, for children who need a tactile route.
- For the closing check: a picture of a ball drawn lit from the left, with its darker side on the right.

Steps

✎ Opening (5 min)

Show the example strip. "Same pencil in every box. How did I make some light and some dark?" Take ideas. Demonstrate: press gently for a light grey; press harder for a dark grey; put lines far apart (looks lighter) and close together (looks darker).

✎ Main activity (25 min)

1. **Light to dark strip (8 min).** Children fill their 4 boxes from very light to very dark, by pressing more each time or by putting lines closer together. Check: "Is each box darker than the one before?"
2. **Torch and ball (7 min).** Dim the room near one table. An adult holds the torch to one side of the ball. Children look and point: "Where is it brightest? Where is it darkest?" Move the torch to the other side: the dark side moves too. Children say what changed.
3. **Shade a drawing (10 min).** With the torch still on one side, children draw the ball (a circle shape, from lesson 1) and fill the side away from the torch with darker marks, keeping the side near the torch light. Children who finish early can draw another object from the looking tray the same way.

✓ Discussion questions (5 min, with answers)

- "Which side of the ball was dark?" (The side away from the torch.)
- "What happened when the torch moved?" (The bright side and the dark side swapped places; the dark side is always the side away from the light.)
- "Name two ways to make a mark darker." (Press harder; put lines closer together. Going over a mark again also works.)

✓ Closing check (5 min, with answers)

Show the picture of the ball lit from the left. "Where was the light? Point to that side."

- Answer: the left side of the picture (the light side). The darker side is on the right, away from the light. Children point; words are optional.

Vocabulary

light, dark, press, gently, harder, shadow, bright, side

Differentiation

- Support: make just two boxes, one light and one dark; or use a soft crayon instead of a pencil.
- Extension: add the ball's shadow on the table, on the side away from the torch.

⚠ Safety

- Shine the torch or lamp at the ball, never into anyone's eyes. Ordinary torches or desk lamps only; no lasers.
- Adults move lamps (they can get warm) and keep cables tidy.
- Pencils point down when carried.

Teacher notes

- Blind or low-vision children: pressing gently or hard on paper over a rubber mat makes shallow or deep grooves that can be felt, so "light" and "dark" can be explored as "gentle" and "strong" marks. A strong torch on a white ball in a dim corner gives the clearest contrast for children with some vision.
- "Left" and "right" in the closing check are from the child's view of the picture; children can simply point.

Lesson 5: My looking drawing

Unit overview - Previous: Lesson 4

Goal: Children choose one object and draw it by looking, using shapes, edges, texture and light and dark, then share drawings in a class gallery and say one thing they like about a classmate's work and why. The end-of-unit one-to-one check runs during the week.

Length: about 40 minutes (can take two sessions).

Materials

- Per child: plain paper (A4 or larger), chunky pencils, soft pencils, pencil grips and crayons; thick black felt pens; tape to hold paper still.
- The looking trays from lesson 1 and the lesson 2 objects, for children to choose from.
- Children's own rubbings from lesson 3, child-safe scissors and glue sticks (optional, for a textured background).
- A torch or desk lamp for any table that wants a clear light side.
- Card shape templates (from lesson 1) for support.
- Glue sticks or wax sticks and a rubber mat for raised-line drawing.
- Sticky notes or small cards printed with "I like... because...", plus a few picture cards (a shape, an edge, a rubbing, a light/dark strip) for children who answer by pointing.
- Blu Tack or pegs and a wall or line for the class gallery.
- For the one-to-one check during the week: a plastic mug; the corrugated-card rubbing and a leaf rubbing with the corrugated card and the leaf; a scrap of paper and a pencil; a ball and a torch.

Steps

✎ Opening (5 min)

Recall the four looking tricks with one gesture each: shapes (draw a circle in the air), edges (snail finger), texture (rubbing motion), light and dark (press-hard fist). "Today you choose one object and use as many tricks as you like."

✎ Main activity (25 min)

1. **Choose and look (4 min).** Each child chooses one object and looks at it for a slow count of ten before drawing: "What shapes? What edge? What texture? Where is it dark?"
2. **Draw (15 min).** Children draw their object large. Suggested order: biggest shape first, then follow the edge, then add darker marks on the side away from the light. Children who want a background can cut and glue a piece of their rubbing behind the object.
3. **Gallery (6 min).** Children who want to put their drawing up do so (showing it to the teacher only is fine). Everyone walks round the gallery once and chooses one drawing they like.

✓ Discussion questions (5 min, with answers)

- "Which looking trick did you use most?" (Any trick, with a reason.)
- "What did you see in your object that surprised you?" (Any real detail.)
- "Does a good drawing have to look exactly like the object?" (No. A good looking drawing shows things the artist really noticed.)

✓ Closing check (5 min, with answers)

Each child says, signs or shows one "I like... because..." about a classmate's drawing, or writes or points on a card.

- Good answers name something in the drawing and a reason ("I like the dark side of the ball because it looks round", "I like the bumpy edge because it looks like the real leaf"). "I like it because it's nice" is a start; ask "What part?".

Vocabulary

choose, look, shape, edge, texture, light, dark, gallery, because

Differentiation

- Support: draw round a card shape template first, then add one thing seen on the object; or tell or point and a partner or adult draws exactly what they say.
- Extension: draw the object twice, once lit from each side, or add a second object and draw where one is in front of the other.

⚠ Safety

- Child-safe scissors only; cut away from fingers and bodies.
- Torch or lamp at the object, never into eyes; adults move lamps.
- Objects as in lessons 1 and 2: nothing sharp, glass or small enough to swallow; check the allergy list for real fruit.

Access

- The child chooses how to take part: drawing, raised-line drawing, a collage of card shapes and rubbings, or telling an adult what to draw.
- The "I like... because..." can be signed, spoken, written, or shown by pointing to a part of the drawing and a picture card.
- No child has to put their drawing in the gallery.

Teacher notes

- One-to-one check: see the README Assessment section (about 4 minutes per child, during the week).

- Keep comments on looking ("You noticed the stalk"), not on talent.

Grade 1 Arts: Beat, Rhythm, High and Low, and a Round (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 9 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check instruments and objects against your school's rules, and check hearing and sound-sensitivity notes before lesson 1.
>
> Text-checked by two other agents (Gemini 4 Argon, Claude Fable 5.2); see Known gaps.

Back to the arts progression | Grade 1 year plan - Term 2

Big idea

Music has a steady beat underneath it, like walking, and a rhythm on top of it, like the pattern of the words. Rhythms can be written down with simple pictures and read back. Notes can be higher or lower, which is different from louder or quieter. When groups start the same song at different times, the parts can still fit together: that is a round.

This is the second arts unit of the grade 1 year (term 2). In kindergarten children kept a steady beat with body percussion and a drum (kindergarten term 1), and heard loud and quiet, fast and slow (kindergarten term 2). Term 1 of grade 1 was drawing from looking; term 3 is a stick-puppet story and show.

Outcomes

By the end of the unit a student can:

1. Keep a steady beat (patting, stepping, tapping or playing) for at least eight beats while a chant or song is going on.
2. Clap (or tap) the rhythm of the words of a short chant, and show the difference between the beat and the rhythm (the beat stays the same; the rhythm follows the words).
3. Read and clap a four-beat rhythm card made of "ta" (one walking step) and "ti-ti" (two running steps), and make their own four-beat card.
4. Say or show whether a second note is higher or lower than a first note, and echo a two-note "so-mi" call (by singing, humming, playing or pointing).
5. Keep their own part going in a two-part round of "Row, Row, Row Your Boat" with a group (by singing, humming, or doing the actions).

Prior knowledge

- From kindergarten arts: a steady beat with body percussion and a drum; stopping on a signal; loud and quiet, fast and slow; singing simple songs.
- From grade 1 science term 1 (Sound and light): sounds are made when things vibrate, and a stretched band can make different sounds. This unit does not need it but can link to it.
- Some children will not yet sing in tune; that is common at six and is not assessed. Humming, playing and actions always count.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week. A hall or a classroom with the tables pushed back works best for lessons 1 and 4.

Lesson	Title	Main activity
1	Beat and rhythm	Walk and pat the beat, then clap the words of a new chant; play "beat or words?"
2	Walking feet and running feet	Read picture rhythm cards (ta and ti-ti), clap them, then make a four-beat card with a partner
3	High and low	Higher and lower notes with hands and bodies, "high or low?" game, so-mi echo calls
4	Row, row, row: a round	Learn the song with actions, then sing it as a two-part round
5	Our music share	Groups perform a rhythm card, the high-low game and the round; one-to-one checks

Materials (whole class unless noted)

- Every lesson: one hand drum (or tambourine) for the teacher; the stop signal (drum plus a raised hand); a class list for notes; water.
- Ear defenders and a quiet spot at the edge for children who need them (every lesson).
- Lessons 1, 4 and 5: the "Rain on the roof" chant on a large card with pictures (words in the Lesson 1 page).
- Lesson 1: two large cards: "BEAT" (a heart or a walking foot) and "WORDS" (a speech bubble); a small BEAT/WORDS card pair per child (smooth and bumpy textures for blind or low-vision children). The two large cards are used again in lesson 5.
- Lessons 2 and 5: large teacher rhythm cards (8 "ta" cards with one big footprint and 8 "ti-ti" cards with two small footprints side by side); per pair, a small set of 4 "ta" and 4 "ti-ti" cards and a strip of card with four boxes (a "four-beat strip"); tactile versions for blind or low-vision children (one large felt circle = ta, two small felt circles = ti-ti).
- Lesson 2: two large cards "A" (ta, ta, ta, ta) and "B" (ta, ti-ti, ta, ta) and a small A/B card pair per child, for the closing check; tactile A and B rows for blind or low-vision children; 4 spare four-beat strips.
- Lessons 1, 2 and 5: untuned percussion, one per child if possible (claves, wooden blocks, tambourines, sealed shakers or drums); a box of spare beaters.
- Lessons 3 and 5: at least one tuned instrument the teacher can play two clearly different notes on (a xylophone, glockenspiel, chime bars or a keyboard); two large cards: "HIGH" (a bird at the top of a tree) and "LOW" (a frog at the bottom), and a small HIGH/LOW card pair per child (tactile version: a raised bump at the top edge of HIGH, the bottom edge of LOW); a screen or large book to hide the instrument (lessons 3 and 5); one "high and low" sheet per child (two long lines, top and bottom, for placing counters) and 6 counters per child (lesson 3); tactile sheets with raised lines and counters with a bump for blind or low-vision children.
- Lessons 4 and 5: the words of "Row, Row, Row Your Boat" on a large card with four pictures (rowing, a stream, a smiling face, a sleeping face); two coloured sashes or cards to mark group 1 and group 2; a second adult to lead group 2, if available. Lesson 4: the tuned instrument, to give the starting note. Lesson 5: the BEAT and WORDS cards; tactile copies of the two closing-check rows.

- One-to-one check (week of lesson 5): the chant card; one four-beat card showing ta, ta, ti-ti, ta (and a tactile copy); the tuned instrument.

Assessment

- Lessons 1-4: the teacher notes answers in the closing checks (observe; no writing needed). Children can answer by clapping, tapping, playing, speaking, signing, pointing or choosing a card.
- Lesson 2 (pairs build a strip) and lesson 5 step 1: the teacher notes who makes their own four-beat card or strip (the making part of outcome 3), by placing cards, pointing or telling a partner where each card goes.
- Lesson 5: groups perform; the teacher notes who keeps a part going in the round (outcome 5) by singing, humming or doing the actions.
- **One-to-one check (about 4 minutes per child, during the week of lesson 5; about 100 minutes for 25 children, so plan extra time outside the five lessons):**
    1. The teacher says the "Rain on the roof" chant. "Pat the beat while I say it." (A steady pat for about eight beats; speeding up a little counts if it stays steady.)
    2. "Now clap the words." (Claps that follow the words rather than the beat; for example, "splash in the pud-dle" gets more claps than "rain on the roof".)
    3. Show a four-beat card (ta, ta, ti-ti, ta). "Clap this card." (Three single claps and one quick pair in the third place; saying "ta ta ti-ti ta" also counts.)
    4. Play a low note, then a high note on the tuned instrument (well apart), out of the child's sight unless their route is watching. "Was the second note higher or lower?" Then the other way round. (Higher, then lower; pointing up or down counts.)
    5. Sing or play a so-mi call ("Hel-lo"). "Echo me." (Two notes, the second lower than the first; humming, playing the two bars, or showing high-then-low with a hand counts.)
- Record each item as "yes / with help / not yet". A child who points, signs, uses a card or plays an instrument has answered. Singing in tune is not marked.

⚠ Safety (read before lesson 1)

- Sound levels: keep instruments and singing comfortable; use the stop signal often; ear defenders and a quiet spot are always allowed. Never play a loud sound close to anyone's ear.
- Voices: sing gently. High notes are not shouting or squeaking; stop if a voice hurts.
- Instruments: no shared mouth-blown instruments (whistles, recorders) in this unit. Shakers must be sealed; check nothing small can come out. Beaters are for instruments only; carry them pointing down.
- Moving: walk in the same direction around the space; stop on the signal; leave space for wheelchairs and walking frames.

Access and taking part

- **Deaf and hard-of-hearing children:** show the beat with a big visible movement (a hand drum held up, a nodding head, a light switched slowly on and off on the beat, only after checking the class's medical notes); let children put a hand on the drum to feel the beat; use the BEAT and WORDS cards and the HIGH and LOW cards so they can join in by watching. Pitch can be shown on the tuned instrument (which end plays the high notes)

and with hand height. Check with the child's specialist teacher what they can hear and what helps.
- **Blind and low-vision children:** tactile rhythm cards (large felt circle = ta, two small felt circles = ti-ti); a raised-line or tactile high-and-low sheet (counters with a bump on the top line); a partner says "start" and "stop" as well as the signal.
- **Children who do not sing or speak:** hum, play an instrument, do the actions, point to cards, sign, or use their communication device. Singing alone is never required.
- **Children with limited hand movement:** pat with elbows or feet, nod, or tap with one finger; a beater with a thick grip; a partner holds the instrument.
- **Wheelchair users:** "walking" the beat can be tapping the armrests or wheeling; actions in "Row, Row, Row Your Boat" can be done seated.
- **Sound-sensitive children:** ear defenders, the quiet spot, quieter instruments (wooden blocks rather than tambourines), and the choice to be the conductor who holds up the cards.

Sources

Read for this unit (Wikipedia, 9 November 2026):

- "Kodály method": https://en.wikipedia.org/wiki/Kod%C3%A1ly_method Used for: the method introduces concepts through listening, singing and movement before notation; the first rhythms taught are quarter notes and eighth notes, which are familiar to children as the rhythms of walking and running; quarter notes are spoken as "ta" and eighth-note pairs as "ti-ti" (some places use "te-te"); rhythmic movement such as walking, running and clapping helps children take in rhythm; revised Kodály exercises begin with the minor third, "mi-so". Lessons 2 and 3 use these ideas with pictures (walking feet and running feet) instead of notation.
- "Pitch (music)": https://en.wikipedia.org/wiki/Pitch_(music) Used for: pitch is the quality that lets us judge sounds as "higher" and "lower" in a melody; it is one property of a musical sound alongside duration, loudness and timbre. Lesson 3 keeps "high/low" separate from "loud/quiet".
- "Round (music)": https://en.wikipedia.org/wiki/Round_(music) Used for: in a round, several voices sing exactly the same melody but start at different times, and the parts fit together; it is one of the easiest forms of part singing because everyone learns only one line; "Row, Row, Row Your Boat" is a well-known children's round for four voices. This unit uses only two parts.
- "Row, Row, Row Your Boat": https://en.wikipedia.org/wiki/Row,_Row,_Row_Your_Boat Used for: the words were first printed in 1852, and the modern tune was first printed with the words in 1881, so the song is old enough to be in the public domain. (Check your own country's rules if you plan to publish recordings.)
- The "Rain on the roof" chant and the "Hel-lo" call are written for this unit (CC0).
- This repository's arts progression (grade 1: "tell pulse from rhythm (clap the beat, then clap the words); sing high and low notes") and the grade 1 year plan term 2 arts cell.

Known gaps and cautions

- Text-checked by Gemini 4 Argon on 9 November 2026 at 0eca0f5 (text only): links, timings, song provenance and access routes were reported clean; two notes (making a four-beat card was not assessed, and lesson 5 pointed "below" to a check that is in this overview) fixed in b7acbdf, which Argon also diff-checked the same day (see PEERCHECKS.md). This is a peer check by an AI agent, not an educator review.

- Second text check by Claude Fable 5.2 on 9 November 2026 at 2c4e1ba (text only; the Wikipedia citations were not re-checked): 11 notes, covering closing checks that could be passed by watching, the chant not fitting ta/ti-ti cards, naming an example so-mi pair, a starting note for the round, the one-adult round, tactile routes for board checks, the flashing-light suggestion, spare strips and the time the one-to-one check takes. All 11 were fixed in 30708fd, which Claude Fable 5.2 also diff-checked the same day (see PEERCHECKS.md). Three optional points from that re-check (screening the lesson 5 pitch question, plainer "an example" wording, drawing strips only for pairs who want to keep them) were fixed in 252e724, which Claude Fable 5.2 also re-checked the same day.
- No official music standard was read for this unit; the content comes from the grade 1 year plan, the arts progression and the Wikipedia articles above, which are drafts and summaries.
- The unit borrows the Kodály rhythm syllables and the so-mi starting interval but is not a Kodály course; a trained music teacher will know far more about sequence and singing range.
- Pitch is described only as "higher" and "lower". Children who cannot hear pitch differences are not marked down; see Access.
- The grade 4 music unit also uses rounds; this unit uses only two parts and one well-known song so grade 4 can build on it.
- Pacing and vocabulary load are untested estimates; a qualified local educator should review the unit before classroom use.
- The order of lessons, the activities and the timings are my choice, not taken from a source.

Lesson 1: Beat and rhythm

Unit overview - Next: Lesson 2

Goal: Children keep a steady beat while saying a chant, clap the rhythm of the words, and tell the beat and the words apart.

Length: about 40 minutes.

Materials

- One hand drum (or tambourine) for the teacher; the stop signal (drum plus a raised hand).
- The "Rain on the roof" chant on a large card, with a picture for each line (rain on a roof, rain on a road, a puddle splash, a toad).
- Two large cards: "BEAT" (a heart or a walking foot) and "WORDS" (a speech bubble). A small BEAT/WORDS card pair per child for the closing check.
- Untuned percussion, one per child if possible (claves, wooden blocks, tambourines, sealed shakers or drums).
- Ear defenders and a quiet spot at the edge for children who need them.
- Water. A class list for notes.

Steps

✎ Opening (5 min)

Children walk around the space while the teacher plays a steady drum beat; they stop on the stop signal. "Walk to my drum." Play a little faster, then slower; children keep in time. "That steady sound, like walking or a heartbeat, is the **beat**. We met it in kindergarten." Show the BEAT card.

✎ Main activity (25 min)

1. **Learn the chant (5 min).** Sitting in a circle. Show the chant card and say it; children echo one line at a time, then say it all together:

   Rain on the **roof** and **rain** on the **road**,
   Splash in the **pud**-dle, **hop** goes the **toad**.

(The bold words fall on the beat: four beats in each line.)

1. **Pat the beat (5 min).** Say the chant again while everyone pats their knees on the beat (the bold words). Then pat the beat while saying the chant in a whisper, then only "thinking" the words. "The beat keeps going the same, steady, steady."
2. **Clap the words (5 min).** "Now clap every bit of every word." Say the chant slowly, clapping each syllable: "Rain-on-the-roof..." Show the WORDS card. "That pattern of the words is the **rhythm**. Is it the same as the beat?" (No: some claps are quick and close together, and "splash in the pud-dle" has more claps than "rain on the roof".)
3. **Beat or words? (5 min).** The teacher holds up BEAT or WORDS while the class says the chant; children pat the beat or clap the words to match. Switch cards in the middle

of a line once children are ready. A child can take the conductor's turn holding up the cards.

4. **Two groups (5 min).** Hand out instruments (instruments stay on the floor until the signal). Half the class plays the beat on their instruments while the other half claps the words; everyone says the chant. Stop signal, swap, repeat. Instruments down on the floor on the signal.

✓ Discussion questions (5 min, with answers)

- "What is the difference between the beat and the rhythm of the words?" (Answer guide: the beat stays steady, like walking; the rhythm follows the words, so some sounds are quick and some are slow.)
- "Which line had more claps: 'rain on the roof' or 'splash in the puddle'?" (Answer guide: "splash in the puddle", five claps against four.)
- "Can you think of something else with a steady beat?" (Answer guide: a clock ticking, walking, a heartbeat, a dripping tap; any steady sound.)

✓ Closing check (5 min, with answers)

Each child has a small BEAT card and a WORDS card. The teacher says the chant and plays the hand drum, either on the beat or on the words, using the same drum both times so the pattern of sounds is the only clue (deaf and hard-of-hearing children watch or feel the drum, so for them the clue is the pattern of movements); children hold up the card that matches. Do it four times, mixing the order. (Answer guide: the card matches what the teacher did. Note on the class list who chooses correctly most times.)

Vocabulary

beat, steady, rhythm, chant, words, pat, clap

Differentiation

- Support: pat the beat with a partner's hand on top; say only the last word of each line; watch the teacher's drum.
- Stretch: pat the beat with one hand and tap the words with the other hand on the other knee; lead the "beat or words?" game.
- Deaf and hard-of-hearing children: watch the drum and the BEAT/WORDS cards; put a hand on the drum to feel the beat; the chant card shows each line.
- Blind and low-vision children: a partner says "start" and "stop" with the signal; BEAT and WORDS cards with different textures (smooth and bumpy).
- Children who do not speak: pat, clap or play while others say the chant, or point to the picture for each line.
- Wheelchair users: in the opening, wheel or tap the armrests on the beat.

⚠ Safety

- Walk in one direction in the opening; leave space for wheelchairs and walking frames; stop on the signal.
- Instruments stay on the floor until the signal; no playing near anyone's ear; ear defenders and the quiet spot are always allowed.

Teacher notes

- Many six-year-olds speed up as they get excited; keep the drum steady and slow down rather than stopping them.
- The chant is written for this unit (CC0). Any short chant or rhyme the class knows can be used instead.
- Keep the words "beat" and "rhythm" in the same meaning all unit: beat = the steady pulse, rhythm = the pattern of the words (or notes).

Lesson 2: Walking feet and running feet

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children read and clap picture rhythm cards ("ta" and "ti-ti") and make their own four-beat rhythm with a partner.

Length: about 40 minutes.

Materials

- One hand drum for the teacher; the stop signal (drum plus a raised hand).
- Large teacher rhythm cards: 8 "ta" cards (one big footprint) and 8 "ti-ti" cards (two small footprints side by side), with a way to stick them to the board in a row of four.
- Per pair: 4 "ta" cards and 4 "ti-ti" cards (small copies) and one "four-beat strip" (a strip of card with four boxes).
- Tactile versions for blind or low-vision children: one large felt circle = ta, two small felt circles = ti-ti, on card the same size as the small cards.
- Untuned percussion, one per child if possible (claves, wooden blocks, tambourines, sealed shakers or drums).
- Two large cards labelled "A" and "B" with a four-beat rhythm on each, for the closing check (A: ta, ta, ta, ta; B: ta, ti-ti, ta, ta), and a small A/B card pair per child. For blind or low-vision children, the A and B rows laid out in tactile cards at their place (and the two rows used in step 2).
- 4 spare four-beat strips (for the stretch and for lesson 5).
- Ear defenders and a quiet spot. Water. A class list for notes.

Steps

✎ Opening (5 min)

Standing in a space. The teacher plays a steady drum beat: children walk on the spot, one step for each beat, saying "ta". Then the teacher plays two quick, even sounds in each beat: children do two quick tiptoe steps on the spot, saying "ti-ti". Switch between the two. "Walking feet: ta. Running feet: ti-ti. The beat stays the same speed; ti-ti just fits two sounds into one beat."

✎ Main activity (25 min)

1. **Meet the cards (5 min).** Sitting facing the board. Show a "ta" card (one big footprint: one sound in a beat) and a "ti-ti" card (two small footprints: two sounds in one beat). Stick four cards in a row: ta, ta, ti-ti, ta. Point to each card on the beat while the class claps and says it. Repeat with two or three more rows.
2. **Which did I clap? (5 min).** Put two rows on the board. Clap one of them; children point to the row they heard (blind or low-vision children feel the two rows in tactile cards at their place). A child can take the clapper's turn.
3. **Make your own (8 min).** In pairs, children choose any four cards and lay them in the boxes of their four-beat strip. They clap and say it together, then try it on instruments

(instruments on the floor until the signal). "Can you clap it the same way twice?" If a pair wants to keep their strip, the teacher draws its four cards on the class list (one big or two small footprints per box) so they can play it again in lesson 5; other pairs make a new strip then.

4. **Play and echo (7 min).** Several pairs play their strip for the class; the class claps it back. The teacher keeps a soft steady beat on the drum underneath if it helps.

✓ Discussion questions (5 min, with answers)

- "How many sounds are there in a ta card? In a ti-ti card?" (Answer guide: one; two.)
- "If all four boxes have ti-ti, how many claps is that?" (Answer guide: eight.) "If all four have ta?" (Answer guide: four.)
- "Can you think of a word that sounds like ta, and one that sounds like ti-ti?" (Answer guide: any one-syllable word for ta, such as "bear" or "rain"; any two-syllable word said evenly for ti-ti, such as "rab-bit" or "pud-dle".)

✓ Closing check (5 min, with answers)

Show cards A and B on the board. The teacher claps one of them; each child holds up A or B (blind or low-vision children touch their tactile A or B row). Do it three times (for example A, B, B). (Answer guide: A is four even claps; B has a quick pair in the second place. Note on the class list who chooses correctly.)

Vocabulary

ta, ti-ti, rhythm card, beat, four-beat, read, echo

Differentiation

- Support: use only ta cards and one ti-ti card; clap with a partner; point to each card while the teacher claps.
- Stretch: make two strips (use a spare strip) and play them one after the other (eight beats); play your strip while a partner keeps the beat.
- Deaf and hard-of-hearing children: watch the teacher point to each card; feel the drum; the footprint pictures show one or two sounds.
- Blind and low-vision children: tactile cards (one large felt circle = ta, two small = ti-ti); feel along the strip while clapping.
- Children who do not speak: clap or tap without saying "ta"; point to the card they heard.
- Children with limited hand movement: tap with one finger, nod, or tap feet; a partner lays the cards as the child chooses.

⚠ Safety

- Tiptoe steps on the spot only; no running around the room.
- Instruments stay on the floor until the signal; no playing near anyone's ear; ear defenders and the quiet spot are always allowed.

Teacher notes

- "Ta" and "ti-ti" are the rhythm syllables used in the Kodály method (some places say "te-te"); see the README Sources. Use whichever your school already uses.
- The footprint pictures stand in for notation; staff notation comes in later grades.
- The "Rain on the roof" chant from lesson 1 has beats with three sounds ("Rain on the" is three sounds in one beat), so it cannot be written with ta and ti-ti cards. Do not use it for card reading.
- Some children will clap ti-ti as two slow claps; keep the drum beat going so they hear the two sounds fit inside one beat.

Lesson 3: High and low

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children say or show whether a note is higher or lower than another, tell high and low apart from loud and quiet, and echo a two-note "so-mi" call.

Length: about 40 minutes.

Materials

- One tuned instrument the teacher can play two clearly different notes on (a xylophone, glockenspiel, chime bars or a keyboard), with a beater if needed.
- One hand drum; the stop signal (drum plus a raised hand).
- Two large cards: "HIGH" (a bird at the top of a tree) and "LOW" (a frog at the bottom). A small HIGH/LOW card pair per child (for blind or low-vision children, the HIGH card has a raised bump at the top edge and the LOW card a bump at the bottom edge).
- A screen or large book to hide the instrument during the closing check.
- One "high and low" sheet per child (two long lines, one at the top and one at the bottom) and 6 counters per child; tactile sheets for blind or low-vision children (raised top and bottom lines, counters with a bump).
- Ear defenders and a quiet spot. Water. A class list for notes.

Steps

✎ Opening (5 min)

Sitting. "In kindergarten we heard loud and quiet." Play one note on the tuned instrument loudly, then the same note quietly: "Loud, quiet. Same note." Then play a low note and a high note at the same loudness: "These are different in another way: one is low, one is high." Show the HIGH and LOW cards. "High and low is not the same as loud and quiet."

✎ Main activity (25 min)

1. **Hands up, hands down (6 min).** Standing or seated. The teacher plays a note, then a second note. If the second note is higher, children reach up high; if it is lower, they reach down low (or move one hand up or down). Start with notes far apart, then closer together.
2. **High or low? (5 min).** The teacher plays one very high or very low note; children hold up HIGH or LOW. A child can take a turn playing the instrument while the class answers (the teacher shows which end plays the high notes).
3. **Counters on the lines (7 min).** Each child has a high-and-low sheet and counters. The teacher plays three notes, one at a time, each clearly high or low; for each note children put a counter on the top line (high) or the bottom line (low), left to right. Check together, clear, and play another three.
4. **So-mi echo (7 min).** The teacher sings "Hel-lo" on two notes, the first higher and the second lower (so-mi), showing the notes with a hand (hand higher on "Hel", lower on "lo"). On a xylophone with letters, G then E works (an example, not from a source; any

two bars that far apart will do). Children echo with voices and hands. Then the teacher sings "Hel-lo, Ma-ya" or another name in the same two notes (a one-syllable name goes on the low note, "Hel-lo, Sam"; for a longer name, sing the first part high and the rest low, "Hel-lo, Ka-ta-lin"), and that child (if they want) echoes "Hel-lo" back, or plays the two notes, or shows high-then-low with a hand.

✓ Discussion questions (5 min, with answers)

- "Is a high note always a loud note?" (Answer guide: no; a high note can be quiet and a low note can be loud.)
- "In our 'Hel-lo' call, was the first note higher or lower than the second?" (Answer guide: higher.)
- "Which end of our instrument plays the high notes?" (Answer guide: whichever end it is on the class instrument; children point to it.)

✓ Closing check (5 min, with answers)

The teacher plays four pairs of notes behind a screen or large book, so the clue is the sound, not which end is played (children whose route is watching the instrument, see the README Access section, still see it); after each pair, children point up if the second note was higher and down if it was lower. Use, for example: low then high; high then low; high then low; low then high. (Answer guide: up, down, down, up. Note on the class list who points correctly most times.)

Vocabulary

high, low, higher, lower, note, pitch (teacher's word), echo

Differentiation

- Support: keep the two notes far apart; a partner points with the child; use the HIGH and LOW cards instead of reaching.
- Stretch: notes closer together; play your own high-low pattern of three notes for a partner to place on their sheet.
- Deaf and hard-of-hearing children: watch the teacher's hand height and the instrument (which end is played); check with the child's specialist teacher what pitch differences they can hear. They are not marked down for pitch they cannot hear.
- Blind and low-vision children: tactile sheet; a partner says "first note", "second note"; reach up and down in their own space.
- Children who do not sing or speak: echo the call by humming, playing the two notes or moving a hand; point to HIGH or LOW.
- Children with limited arm movement: show high and low with eyes, head or one finger, or by choosing a card.

⚠ Safety

- Sing gently; high notes are not shouting or squeaking.

- Play the instrument at a comfortable volume; ear defenders and the quiet spot are always allowed.
- Counters stay on the sheet (check the class list for children who still mouth small objects; use larger counters if so).

Teacher notes

- The Kodály method starts singing with the two notes "so" and "mi" (a minor third); see the README Sources. Children do not need these names. On a lettered xylophone, G then E is one pair that far apart (with C as "do", G is "so" and E is "mi"); this is an example, not from a source.
- "Pitch" is the teacher's word for how high or low a note is; children can use "high" and "low".
- If the instrument is quiet, keep the room very still; if it is loud, play gently. The point is high and low, not loud and quiet.

Lesson 4: Row, row, row: a round

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children learn "Row, Row, Row Your Boat" with actions, then keep their own part going while it is sung as a two-part round.

Length: about 40 minutes.

Materials

- One hand drum; the stop signal (drum plus a raised hand).
- The "Rain on the roof" chant card (from lesson 1) for the warm-up.
- The words of "Row, Row, Row Your Boat" on a large card with four pictures: rowing arms, a stream, a smiling face, a sleeping face.
- Two coloured sashes or cards to mark group 1 and group 2 (enough for every child, or a coloured card for each group to sit by).
- The tuned instrument from lesson 3, to give the starting note.
- A second adult if available, to lead group 2.
- Ear defenders and a quiet spot. Water. A class list for notes.

Steps

✎ Opening (5 min)

Standing. Say the "Rain on the roof" chant while patting the beat. Then a gentle voice warm-up: a soft "ooo" sliding from low to high and back down ("like a car going up a hill and down again"), hands following the sound. "Gentle voices: no shouting."

✎ Main activity (25 min)

1. **Learn the song (7 min).** Show the song card. Sing it line by line; children echo each line with its action:

   Row, row, row your boat, (rowing arms)
   Gently down the stream. (hand making a wave)
   Merrily, merrily, merrily, merrily, (big smile, hands swaying)
   Life is but a dream. (hands together under a cheek, eyes closed)

1. **All together (3 min).** Sing it twice with actions, patting the beat on knees the second time.
2. **Teacher sings the second part (5 min).** "Now I'll start the same song later than you. Keep going with your part, whatever you hear." The class sings; when they reach "Gently down the stream", the teacher starts "Row, row, row your boat". Do it twice. "Were we singing the same song? Did it still fit?"
3. **Two groups (10 min).** Split the class into group 1 and group 2 (mark with sashes or cards), sitting apart, each with an adult leader if possible. With one adult, the teacher sits with group 2 and brings it in, since group 1 needs no cue. Before each group starts,

the leader gives the starting note (plays it on the tuned instrument or sings the first "Row"), so both groups start on the same note. Group 1 starts; group 2 starts when group 1 reaches "Gently down the stream". Each group sings the song twice through and then stops, so group 2 finishes on its own. Do it, swap which group starts, and do it again. Actions help everyone keep their place.

✓ Discussion questions (5 min, with answers)

- "Were both groups singing the same song?" (Answer guide: yes, the same words and tune, but starting at different times.)
- "What helped you keep your own part going?" (Answer guide: listening to my own group, doing the actions, watching our leader, putting a hand over one ear; any helpful idea.)
- "What happened at the end?" (Answer guide: group 1 finished first; group 2 finished on its own.)

✓ Closing check (5 min, with answers)

The class sings the round once more in its two groups, with a child as group leader if someone wants to. (Answer guide: watch who keeps their own part going by singing, humming or doing the actions, even when the other group is on a different line; note them on the class list.)

Vocabulary

round, part, group, start, together, actions, gently

Differentiation

- Support: sit next to the adult leader; do the actions only; sing the song in unison until the round feels easy.
- Stretch: three groups (the third starts when the second reaches "Gently down the stream"); a child leads a group.
- Deaf and hard-of-hearing children: follow the song card and the actions; the adult leader points to each picture as the group sings it.
- Blind and low-vision children: sit next to the adult leader; a gentle tap on the shoulder to start.
- Children who do not sing or speak: do the actions, hum, or sign the words; this is keeping a part going.
- Wheelchair users and children with limited movement: actions can be done seated or with one hand, eyes or head.

⚠ Safety

- Gentle voices; stop if a voice hurts; water available.
- Groups sit apart, but not so far that children cannot see their leader.

- Ear defenders and the quiet spot are always allowed; a round can be loud when both groups sing.

Teacher notes

- "Row, Row, Row Your Boat" is a well-known children's round for up to four voices; the words were printed in 1852 and the modern tune in 1881 (see the README Sources). This unit uses two parts.
- Bringing the second group in when the first reaches "Gently down the stream" is my choice for this unit, not taken from a source. If the parts do not fit with your class's tune, try a different starting point.
- If two groups fall apart, go back to the teacher singing the second part against the whole class; that is still a round.

Lesson 5: Our music share

Unit overview - Previous: Lesson 4

Goal: Children perform a rhythm card, the high-low game and the round for the class, say one thing they liked about another group's music, and finish the unit with a one-to-one check.

Length: about 40 minutes (one-to-one checks happen during the week).

Materials

- One hand drum; the stop signal (drum plus a raised hand).
- The "Rain on the roof" chant card (from lesson 1).
- Large teacher rhythm cards (8 "ta", 8 "ti-ti"); per pair, the 4 "ta" and 4 "ti-ti" cards and a four-beat strip from lesson 2 (a second strip, from the lesson 2 spares, for pairs trying the stretch); tactile versions.
- Untuned percussion, one per child if possible.
- The two large BEAT and WORDS cards (from lesson 1).
- The tuned instrument from lesson 3 and a screen or large book to hide it during the closing check.
- For blind or low-vision children, the two closing-check rows laid out in tactile cards at their place.
- One tuned instrument (as in lesson 3); the large HIGH and LOW cards and a small HIGH/LOW pair per child.
- The "Row, Row, Row Your Boat" song card and the group 1 / group 2 sashes or cards (from lesson 4).
- For the one-to-one check: the chant card, one four-beat card showing ta, ta, ti-ti, ta (and a tactile copy), and the tuned instrument.
- Ear defenders and a quiet spot. Water. A class list for notes.

Steps

✎ Opening (5 min)

Standing. Walk to the drum beat and stop on the signal (as in lesson 1). Then pat the beat to the chant, and clap the words: "Beat or words?" with the teacher calling which and holding up the BEAT or WORDS card.

✎ Main activity (25 min)

1. **Rhythm cards (10 min).** Pairs make a new four-beat strip (or play the one from lesson 2, if the teacher drew it on the class list) and practise for two minutes. Pairs then play their strip on instruments for the class, one after another; the class claps each one back. Pairs who would rather not play alone play together with another pair, or the teacher plays it with them.
2. **High or low? (5 min).** Children take turns as the player: they play one high or one low note on the tuned instrument, and the class holds up HIGH or LOW.

3. **The round (5 min).** Group 1 and group 2 sing "Row, Row, Row Your Boat" as a round with actions, then swap who starts.
4. **I liked... because... (5 min).** Children say, sign or point to show one thing they liked about another pair's or group's music and why ("I liked their rhythm because it had three ti-tis"). Sharing is opt-in; a thumbs-up for the class counts.

✓ Discussion questions (5 min, with answers)

- "What is the difference between the beat and the rhythm?" (Answer guide: the beat is steady like walking; the rhythm follows the words or the cards.)
- "What did you find easiest, and what was hardest?" (Answer guide: any honest answer.)
- "How could we use a round again?" (Answer guide: sing another round, play the beat while others sing; any sensible idea.)

✓ Closing check (5 min, with answers)

The teacher claps two four-beat rows from the board, one at a time; the class says or points to which row it was (blind or low-vision children touch the matching tactile row). Then the teacher plays two notes behind the screen or large book (unless a child's route is watching): "Up or down?" (Answer guide: the row clapped; up if the second note is higher, down if lower. Note who answers on the class list; the full check is the one-to-one check in the unit overview (README Assessment section).)

Vocabulary

beat, rhythm, ta, ti-ti, high, low, round, perform, audience

Differentiation

- Support: play a rhythm strip with the teacher; join the round with the actions only.
- Stretch: play an eight-beat rhythm (two strips); lead a group in the round; play a three-note high-low pattern for the class.
- Deaf and hard-of-hearing, blind and low-vision children, and children who do not sing or speak: use the same routes as lessons 1-4 (cards, actions, tactile cards, a partner, an instrument).
- Children who do not want to perform: play with the whole class, or show the teacher only.

⚠ Safety

- Instruments stay on the floor until the signal; no playing near anyone's ear.
- Gentle voices; ear defenders and the quiet spot are always allowed.

Teacher notes

- One-to-one check: see the README Assessment section (about 4 minutes per child, during the week; that is about 100 minutes for 25 children, so plan extra time outside

the five lessons). It covers outcomes 1-4 (making their own four-beat card is noted during step 1 above and lesson 2); outcome 5 (keeping a part in the round) is noted during the group round in lesson 4 and step 3 above.
- Keep comments on what children did ("You kept the beat steady all the way through"), not on talent or on singing in tune.

Grade 1 Arts: A Story with Stick Puppets and a Class Show (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 10 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check craft materials, photo rules and visitor rules against your school's policies before lesson 1.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the arts progression | Grade 1 year plan - Term 3

Big idea

A puppet is an object that a person (a puppeteer) moves so that it seems alive. A puppeteer shows how a character feels by how the puppet moves and by the voice they give it. A story has a beginning, a middle and an end, and a group can tell one together, change part of it, practise it and share it with an audience.

This is the third arts unit of the grade 1 year (term 3). It builds on the kindergarten term 3 unit, where children acted out a story with their bodies and put three picture cards in order, and on grade 1 term 1, where they drew carefully from looking. The story is The Hat on the Hill, written for this unit (an example, not from a source) and released under CC0 with the rest of the unit. It is set in Little Hill, the same made-up town as the grade 1 society units.

Outcomes

By the end of the unit a student can:

1. Make a stick puppet walk, jump and stop, and show at least one feeling (for example happy, sad or surprised) by how the puppet moves.
2. Put the beginning, middle and end of The Hat on the Hill in order and tell, sign or show what happens in each part.
3. Make a stick puppet of one character, choosing with their group what it needs so the audience can tell who it is.
4. Help their group change one part of the story, adding to someone else's idea, and practise the new version.
5. Take part in the class puppet show and say, sign or show one choice they made for their puppet.

Prior knowledge

- Kindergarten term 3 arts: freeze frames, moving like a character, acting a short story, ordering three picture cards.
- Grade 1 term 1 arts: drawing shapes they can see; light and heavy marks.
- Grade 1 literacy and society: listening to a story and retelling it; Little Hill as a made-up town with a pond, a park and a hill.

Lessons

Lessons are about 40 minutes. Lesson 5 is the show; plan it for a time when another class or visitors can come if your school allows. Visitors are optional; the show works with just the class.

Lesson	Title	Main activity
1	What is a puppet?	Watch a demonstration puppet, then make a plain practice puppet walk, jump, stop and show feelings
2	The Hat on the Hill	Listen to the story, join in the repeated lines, order beginning, middle and end cards, choose parts in groups of four
3	Making our puppets	Draw and colour one character; an adult fixes it to the stick; groups check that the audience can tell who is who
4	Change one thing and practise	Groups choose one change to the story, building on each other's ideas, and practise behind the table screen
5	Our puppet show	Each group performs; the audience spots how puppets showed feelings; one-to-one checks

Materials (whole class unless noted)

- One demonstration puppet made by the teacher before lesson 1: a duck drawn on card, about the size of a hand, taped to a jumbo craft stick.
- Jumbo craft sticks (wide wooden sticks with rounded ends, about 15 cm long): one per child, one per group of four for the hat prop, one for the teacher's hat prop, and a few spares. Each child's stick is used in lessons 1 and 3.
- Red hat props: a tall red card hat with a band, taped by an adult to a jumbo craft stick; one for the teacher (lesson 2) and one per group of four (lessons 3 to 5).
- Card circles about the size of a hand: one per child for the plain practice puppet in lesson 1.
- Card rectangles about the size of a hand (A6 or a quarter of A4), one per child, for the character puppets in lesson 3, plus spares.
- Crayons or felt-tip pens, glue sticks, small scraps of paper, fabric or wool for decoration (per group of four).
- Masking tape (adult use) and adult scissors; child safety scissors only if your school uses them at this age.
- A "table screen": a table with a cloth or sheet of card hanging down the front, so children can kneel or sit behind it and hold puppets above the top edge. A second table helps if you have two groups practising at once.
- Three large story picture cards for The Hat on the Hill (beginning: Duck walking up the hill in a red hat; middle: the wind blowing the hat away; end: Mouse finding the hat under a bush). Draw them yourself or have them drawn; one small set per group of four for ordering.
- Four role cards per group of four (Duck, Hen, Mouse, Wind) with a simple picture on each.
- One plain craft stick without card, for the "one stick, many things" game in lesson 1.
- Three feeling picture cards (happy, sad, surprised), large enough for the class to see (lesson 1).
- Sticky notes and a pen for adults, to record each group's change (lesson 4).
- A class list for notes.
- A stop signal: a small bell plus a raised hand.
- For access, as needed: a ruler or foam to widen stick handles; felt and wool for tactile puppets and a tactile set of story cards with a string hill line and a felt bush flap as touch landmarks (lesson 2); a sealed shaker for a Wind sound.

- Optional: a tablet or camera to take photos of puppets (not of faces) if your school allows; a small "programme" card listing the groups in order (lesson 5).

Assessment

Assessment is by watching and listening during the lessons, plus a short one-to-one check in lesson 5. Nothing is written by children.

Outcome	Where it is checked	What counts
1. Moves a puppet to show actions and a feeling	Lesson 1 main activity and closing check; lesson 4 practice	The puppet walks, jumps and stops on the signal, and its movement shows a feeling the child chose (the child can say, sign or point to which)
2. Orders and tells the story	Lesson 2 closing check; lesson 5 one-to-one	Cards in order; one thing told or shown for each part
3. Makes a puppet the audience can recognise	Lesson 3 "can they tell?" check	Another child can name or point to the character from the puppet alone
4. Helps change and practise the story	Lesson 4 group work (adult notes)	Child suggests or adds to a change ("yes, and...") and practises the new version with the group
5. Performs and names a choice	Lesson 5 show and one-to-one	Child takes part in the show and says, signs or shows one choice (for example "Hen walks slowly because she is old" or "I made Mouse jump when she found the hat")

Taking part in the show can be from behind the screen, with a partner, or in the child's own way; see Access and taking part.

⚠ Safety (read before lesson 1)

- Use only jumbo craft sticks with rounded ends as puppet rods. No pencils, skewers, dowels with sharp ends or anything pointed.
- Puppets stay below the faces of other children. Agree a rule in lesson 1: "Puppets point up, and stay in front of you, not near faces."
- Adults do all cutting of card that needs adult scissors and all taping of card to sticks.
- Glue sticks only, no hot glue. Check small decorations (beads, buttons) are not used if any child in the class still puts things in their mouth; scraps of paper, fabric and wool are enough.
- The table screen is a normal table standing on its feet with a cloth hanging down. Do not tip tables on their sides and do not let children stand on chairs to reach.
- In lesson 1 nobody blows towards anyone else's face when playing the wind; the Wind puppeteer waves the hand instead.

Access and taking part

- **Holding a stick:** a child who finds it hard to grip a thin stick can use a wider handle (tape the stick to a ruler or wrap it in foam), hold the puppet with both hands, rest an elbow on the table, or work with a partner who holds while they give the voice. The child's own way counts.

- **Not speaking or not wanting to speak:** the child can sign, use their communication device, use a recorded line, make the puppet nod or shake its head, or have a partner speak the line while they move the puppet. Moving the puppet is a full part.
- **Deaf and hard-of-hearing children:** use a visual stop signal (a hand up or a light) as well as the bell; face the child when telling the story; let the group agree signs for the repeated lines.
- **Blind and low-vision children:** make their puppet with textures they can feel (felt, wool, a cut-out shape stuck on card); describe the picture cards and the demonstration puppet aloud; let them hold the teacher's puppet; tell them where the screen's top edge is and let them feel it.
- **Colour vision:** the hat is red, but it also has a clear shape (a tall hat with a band), so nobody needs the colour to find it.
- **Wheelchair users and seated children:** set the screen at seated height (a lower table, or a box on a table) so seated and kneeling puppeteers hold puppets at the same height.
- **Being watched:** being behind the screen helps many shy children. Any child may also perform with a partner, or take a job (bell ringer, announcer, "Wind" sound maker) instead of a puppet. Nobody is made to perform alone.

Sources

Read for this unit (10 November 2026):

- National Coalition for Core Arts Standards, Theatre at a Glance (National Core Arts Standards, theatre): https://www.nationalartsstandards.org/sites/default/files/Theater_resources/Theatre%20at%20a%20Glance.pdf The PDF's columns run together when its text is extracted, so the grade 1 column was matched against a per-grade listing of the same standards (https://www.commonplanner.com/standards/national-core-arts-standards-4f837f24/theatre/grade-1-0fd4f6ab) and each phrase used was found in the PDF. Grade 1 lines used:
  - TH:Cr1.1.1 b: "Collaborate with peers to conceptualize costumes and props in a guided drama experience" (lesson 3).
  - TH:Cr2.1.1 a: "Contribute to the development of a sequential plot in a guided drama experience" (lessons 2 and 4).
  - TH:Cr3.1.1 a: "Contribute to the adaptation of the plot in a guided drama experience" (lesson 4).
  - TH:Cr3.1.1 c: "Collaborate to imagine multiple representations of a single object in a guided drama experience" (lesson 1's "one stick, many things" game).
  - TH:Pr4.1.1 b: "Use body, face, gestures, and voice to communicate character traits and emotions in a guided drama experience" (lessons 1, 4 and 5; here mostly through the puppet's movement and the child's voice).
  - TH:Re7.1.1 a: "Recall choices made in a guided drama experience" (lesson 5).
  - TH:Re9.1.1 a: "Build on others' ideas in a guided drama experience" (lesson 4).
  - TH:Cn11.2.1 b: "With prompting and support, tell a short story in dramatic play or a guided drama experience" (lessons 2 and 5). This unit uses these lines as a guide; it does not claim to meet them.
- "Puppetry", Wikipedia: https://en.wikipedia.org/wiki/Puppetry Used for: puppetry is a form of theatre or performance in which a puppeteer moves puppets, objects that often look like a person or an animal; puppeteers use their hands and arms to move rods or strings; the puppeteer sometimes speaks in the puppet's voice; the script is called a puppet play. Lesson 1 uses the words "puppet" and "puppeteer" from this.

The story The Hat on the Hill, the role cards, the "one stick, many things" game and the lesson order are the author's own choices.

Known gaps and cautions

- Written 10 November 2026. Text-checked by Gemini 4 Argon the same day (all six files, links, timings and the NCAS theatre grade 1 lines): no errors, three optional notes (touch landmarks on the tactile story cards; a hat prop hand-off tip; children with show jobs join the puppet freeze), all added in 635565b, which Gemini 4 Argon also diff-checked the same day (see PEERCHECKS.md). Not yet checked by a teacher.
- The story is original and short on purpose. It has not been tried with children, so the length and the repeated lines may need changing.
- Only stick (rod) puppets are used. Glove, shadow and string puppets, and the long puppet traditions of many countries, are not covered; a later unit could look at them with real sources.
- Groups of four with fixed roles are a simple choice, not a rule. Classes that do not divide by four need a group of three (one child plays both Hen and Mouse) or five (two Winds).
- Pacing is untested. Lesson 3 (making) and lesson 4 (practice) are the most likely to run long; the show can spread over two sessions.
- Photos and visitors depend on school policy. Photograph puppets, not children's faces, unless your school's rules and families' permissions allow it.
- No standard for grade 1 arts was used to plan the whole year; see the grade 1 year plan. The National Core Arts Standards lines above were read for this unit only.

Lesson 1: What is a puppet?

Unit overview - Next: Lesson 2

Goal: Children learn the words "puppet" and "puppeteer", find out that one plain object can be many different things, and make a plain practice puppet walk, jump, stop and show a feeling.

Length: about 40 minutes.

Materials

- The teacher's demonstration duck puppet (card duck on a jumbo craft stick).
- One plain jumbo craft stick without card, for the "one stick, many things" game.
- One practice puppet per child, made before the lesson: a card circle taped by an adult to the top of a jumbo craft stick. Keep a few spares.
- Crayons or felt-tip pens (per group of four), for drawing a face on the practice puppet.
- Three feeling picture cards, large enough for the class to see: happy (a big smile), sad (a down-turned mouth and a tear), surprised (round eyes and round mouth).
- The table screen (a table with a cloth hanging down the front).
- A stop signal: a small bell plus a raised hand.
- A class list for notes.

Steps

✎ Opening (5 min)

1. Hide the duck puppet below the table screen. Say: "Someone has come to visit. Let's see if they are brave enough to come up." Bring the duck up slowly over the top edge, look around, and give it a small voice: "Hello! I am Duck. I live in Little Hill."
2. Make Duck walk along the top edge (small up-and-down bobs), jump, and stop still. Then come out from behind the screen with Duck.
3. Ask: "Is Duck really alive?" (No.) "What made Duck move?" (You did, your hand and the stick.) Say: "Duck is a **puppet**: an object that a person moves so it seems alive. The person who moves it is a **puppeteer**."

✎ Main activity (25 min)

1. **One stick, many things (5 min).** Hold up the plain craft stick. Say: "In a puppet show, one thing can be pretend for lots of things." Show one idea yourself: hold it like a spoon and pretend to stir soup. Pass the stick around a small circle (or around the class while seated). Each child who wants a turn shows what the stick could be (a toothbrush, a fishing rod, a magic wand, a flute, an oar). Children may pass. Say "Yes, it could be!" to every idea. The stick stays below faces; nobody points it at anyone.
2. **Puppet rules (2 min).** Give out practice puppets. Agree the rules and say them together: "Puppets point up. Puppets stay in front of me, not near faces. When the bell rings, puppets freeze."
3. **Draw a face (5 min).** Children draw a simple face on their circle with crayon. Any face is fine. Stop on the signal.

4. **Puppet moves (8 min).** Children sit or kneel in a space. Call out moves one at a time; children make their puppet do them, then freeze on the bell:
    - walk (small up-and-down bobs, side to side);
    - jump (a quick lift and back down);
    - stop and hold still (a "puppet freeze");
    - look one way, then the other way (turn the stick a little in the fingers);
    - fall asleep (sink slowly down);
    - wake up (rise slowly). Model each move with Duck first.
5. **Feelings (5 min).** Show the happy card. Ask: "How might a happy puppet move?" Take ideas (bouncy, quick, up high). Everyone tries; freeze on the bell. Do the same for sad (slow, droopy, low down) and surprised (a quick jump up, then very still). Say: "A puppet's face can't change, so the puppeteer shows the feeling by how it moves, and with their voice."

✓ Discussion questions (5 min, with answers)

- "What is a puppet?" (An object that a person moves so it seems alive.)
- "What do we call the person who moves it?" (A puppeteer.)
- "Duck's face never changed. How did we know Duck was happy?" (By how Duck moved: bouncy and quick; and the happy voice.)
- "Was it a problem that the stick was really just a stick?" (No; in a show we pretend it is something else, and the audience can pretend too.)

✓ Closing check (5 min, with answers)

Children stand or sit in a space with their practice puppet.

1. Say "walk", "jump" and "freeze", one at a time. Look for each child's puppet doing the move and freezing on the bell.
2. Show one feeling card (happy, sad or surprised). Children make their puppet show that feeling. Then show a second card.
3. Expected: the puppet walks, jumps and freezes on the signal; happy is bouncy or quick, sad is slow or low, surprised is a quick jump then still. Any movement the child can explain counts ("Mine is sad because it is lying down").

Note on a class list any child who could not yet freeze on the signal or show a feeling; check again in lesson 4 practice.

Collect the practice puppets. Keep the sticks for lesson 3.

Vocabulary

puppet, puppeteer, move, freeze, feeling, happy, sad, surprised, pretend

Differentiation

- **More support:** use only walk, jump and freeze; let the child copy Duck's moves; hold the puppet with two hands.

- **More challenge:** the child shows a feeling without a card and a partner guesses it; or shows "tired" or "cross" with movement only.
- **Holding a stick:** wider handle (stick taped to a ruler or wrapped in foam), both hands, elbow on the table, or a partner holds the puppet while the child says or signs which move to do.
- **Blind and low-vision children:** let them hold and feel Duck first; describe each move in words ("Duck goes up and down, up and down"); describe the feeling cards aloud.
- **Deaf and hard-of-hearing children:** use the raised hand for freeze as well as the bell; sign or point to the feeling cards.
- **Not speaking:** the child can point to the feeling card that matches their puppet instead of saying it.

⚠ Safety

- Only jumbo craft sticks with rounded ends.
- Puppets stay below other children's faces; check spacing before moves.
- During "one stick, many things", nobody pretends the stick is a sword or a weapon pointed at someone; if a child suggests one, they may show it pointed at the floor or pick another idea.

Teacher notes

- The words "puppet" and "puppeteer" follow the Wikipedia article "Puppetry" (read 10 November 2026; see the unit sources).
- The "one stick, many things" game follows the grade 1 theatre standard line about imagining "multiple representations of a single object" (see the unit sources). It also warms children up to pretending in the show.
- Make the duck puppet before the lesson: draw a duck about the size of your hand on card, cut it out, and tape it firmly to the top of a jumbo craft stick. It does not need to be beautiful; a simple shape is easier for children to copy.
- Keep the practice puppets' sticks; in lesson 3 an adult takes off the circle and tapes the new character card to the same stick.

Lesson 2: The Hat on the Hill

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children listen to a short story, join in its repeated lines, put its beginning, middle and end in order, and choose a part for their group's puppet show.

Length: about 40 minutes.

Materials

- The teacher's demonstration duck puppet.
- The red hat prop for the teacher: a tall red card hat with a band, taped by an adult to a jumbo craft stick. (Make one more per group of four for lesson 3.)
- The three large story picture cards (beginning: Duck walking up the hill in a red hat; middle: the wind blowing the hat away; end: Mouse finding the hat under a bush), and one small set per group of four.
- Four role cards per group of four (Duck, Hen, Mouse, Wind), each with a simple picture.
- The story text below, on a card for the teacher.
- A stop signal: a small bell plus a raised hand. A class list for notes.
- For access, as needed: a tactile story-card set (a felt hat stuck on each card in a different place, plus a string hill line and a felt bush flap as touch landmarks) and a sealed shaker for the Wind sound.

The story: The Hat on the Hill

Written for this unit (an example, not from a source). CC0.

> **Beginning.** In Little Hill, Duck had a new red hat: a tall hat with a band. "What a fine day," said Duck. "I will walk up the hill." Up, up, up the hill went Duck.
>
> **Middle.** At the top of the hill, along came the Wind. "Whoosh!" said the Wind. Off flew the hat! Up it went, and down it went, and away. "Oh no!" said Duck. "My hat!"
>
> Duck met Hen. "Hen, have you seen my hat?" "Not me, not me!" said Hen. "But I will help you look." Hen looked up high, in the tree. No hat.
>
> Duck and Hen met Mouse. "Mouse, have you seen my hat?" "Not me, not me!" said Mouse. "But I will help you look." Mouse looked down low, under the bush.
>
> **End.** "Here it is!" said Mouse. The red hat was under the bush. "Thank you, Mouse! Thank you, Hen!" said Duck, and put the hat back on, holding it with one wing. "Whoosh!" said the Wind. But this time, the hat stayed on.

Steps

✎ Opening (5 min)

1. Bring Duck up over the table screen with the hat prop held on top of its head. Duck says: "Hello again! Today I want to tell you about the day I lost my hat."

2. Remind the class: "Stories have a **beginning**, a **middle** and an **end**. In kindergarten you put three story cards in order. Today there is a new story."

✎ Main activity (25 min)

1. **Tell the story (7 min).** Tell The Hat on the Hill with Duck and the hat prop. Hold up each large picture card as you reach that part. At the "Whoosh!", drop the hat prop down behind the screen; at "Here it is!", bring it up again.
2. **Join in (6 min).** Tell it again. This time the class joins in:
    - everyone says (or signs) "Whoosh!" and waves one hand like the wind;
    - Duck's line "Have you seen my hat?" (the teacher points to the class);
    - the answer "Not me, not me! But I will help you look." Agree a simple action for each line together (for example open palms for "Have you seen my hat?", shaking head for "Not me, not me!").
3. **Order the cards (6 min).** Groups of four get a small set of story cards, mixed up. They put them in order: beginning, middle, end. Go round and ask one child per group: "What happens here?" for one card.
4. **Choose parts (6 min).** Give each group the four role cards: Duck, Hen, Mouse and Wind. Each child says or points to the part they would like. If two want the same part, they agree a fair way: one takes it now and the other chooses next, or they draw lots: an adult holds the wanted role card and one other card face down, and each child picks one. Explain: "Duck's puppeteer also holds the hat at the start. The Wind's puppeteer says 'Whoosh!' Mouse's puppeteer brings the hat back at the end." Write each child's part on the class list.

✓ Discussion questions (5 min, with answers)

- "What happens at the beginning?" (Duck has a new red hat and walks up the hill.)
- "What happens in the middle?" (The wind blows the hat away; Duck asks Hen and Mouse for help.)
- "What happens at the end?" (Mouse finds the hat under the bush, and this time Duck holds it on.)
- "How might Duck feel in the middle? How could a Duck puppet show it?" (Duck might feel sad or worried; the puppet could move slowly or droop, or say "Oh no!" in a sad voice. Other answers can be right if the child can say why.)
- "Why did Mouse find the hat, and not Hen?" (Hen looked up high; the hat was down low, under the bush, where Mouse looked.)

✓ Closing check (5 min, with answers)

1. Each group shows their three cards in order. Expected: Duck walking up the hill, then the wind blowing the hat away, then Mouse finding the hat.
2. Point to one card in each group and ask a child who has not answered yet to tell, sign or show (with their body or the role card) what happens in that part. Expected: one true thing about that part (for example "The wind blew it" for the middle card).

Note on the class list any child who put cards out of order or could not tell one part; check again one-to-one in lesson 5.

Vocabulary

beginning, middle, end, story, part, character, hat, wind, whoosh

Differentiation

- **More support:** the child orders just two cards first (beginning and end), then adds the middle; or points to the card when the teacher says "Show me where the wind blows the hat."
- **More challenge:** the child retells the whole story in order using the cards, or makes up a fourth card ("What happened the next day?").
- **Not speaking:** the child points to the card, uses the agreed actions for the repeated lines, or uses their communication device; the Wind part can be done with a hand wave and a shaker instead of words.
- **Blind and low-vision children:** describe each card in a few words as you hold it up; give the group a tactile card set (a felt hat stuck on each card in a different place: on Duck's head, in the air, under a bush; a string hill line and a felt bush flap on each card make the places easy to tell apart by touch) so they can order by touch.
- **Deaf and hard-of-hearing children:** face the child when telling the story; use the agreed actions for the repeated lines as signs.

⚠ Safety

- Keep the hat prop's stick pointing up and below faces when you bring it to show children.

Teacher notes

- The story is written for this unit and is released under CC0, so you can copy, change and share it. You may change the animals or the place.
- The beginning, middle and end follow the grade 1 theatre standard line about contributing to "a sequential plot" (see the unit sources).
- The three-card sort repeats the kindergarten term 3 routine, with a longer story and a "middle" that has more than one event. If many children find the middle hard, tell it as "the wind blew the hat, then Duck asked for help".
- Parts: roles are not about who is "best". Keep the role cards; children hold them in lesson 3 so they know which character to draw.

Lesson 3: Making our puppets

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Each child makes a stick puppet of their character. Groups talk about what each puppet needs so the audience can tell who is who, and check that another group can tell.

Length: about 40 minutes.

Materials

- The teacher's demonstration duck puppet.
- Each child's jumbo craft stick from lesson 1 (an adult takes off the practice circle before the lesson), plus spares.
- Card rectangles about the size of a hand, one per child, plus spares.
- Crayons or felt-tip pens, glue sticks, and small scraps of paper, fabric or wool (per group of four).
- Adult scissors and masking tape (adult use only); child safety scissors only if your school uses them at this age.
- The role cards from lesson 2 (one per child).
- One red hat prop per group of four (a tall red card hat with a band on a jumbo craft stick, made by an adult before the lesson).
- The three large story picture cards, to look at for ideas.
- A stop signal (bell plus raised hand). A class list for notes.

Steps

✎ Opening (5 min)

1. Hold up Duck. Ask: "If Duck didn't talk, how would you still know it is a duck?" Take answers (the beak, the shape, the feet, the colour).
2. Say: "These are **clues** for the audience. Today you make your puppet, and you give it clues so the audience can tell who it is."

✎ Main activity (25 min)

1. **Group talk (5 min).** Each group sits with its four role cards. Ask each group to agree one or two clues for each character. Go round and help with questions, not answers: "What does a hen have on her head?" "What is special about a mouse's tail?" "How could you draw the wind?" Ideas children often reach (examples, not rules):
    - Duck: a flat beak, webbed feet.
    - Hen: a red comb on top of the head, a pointed beak.
    - Mouse: round ears, a long thin tail, very small.
    - Wind: a cloud with puffed-out cheeks, swirly lines coming out. Each group also chooses one thing to add to their hat prop (a feather from scrap paper, a pattern on the band). One child adds it while the others draw.

2. **Draw and colour (12 min).** Each child draws their character big, so it fills most of the card, and colours it with strong colours so it can be seen from the back of the room. Children may glue on scraps (wool for a tail, fabric for feathers).
3. **Fix to the stick (8 min, overlapping).** As each child finishes, an adult cuts round the shape if the child wants (a rectangle is fine too) and tapes the card firmly to the top of the child's stick, at the back. While they wait, children practise a walk and a freeze with their new puppet, below faces.

✓ Discussion questions (5 min, with answers)

- "What clue did you give your puppet?" (Any clue the child chose, such as "Hen has a red comb.")
- "Why did we draw them big and bright?" (So the audience can see them from far away.)
- "Did your group have the same idea for the wind, or different ideas?" (Either is fine; different groups can show the wind in different ways.)

✓ Closing check (5 min, with answers)

Can they tell? Pair up groups. One group holds up its four puppets in a mixed order, one at a time, without speaking. The other group points to the matching role card (Duck, Hen, Mouse or Wind) or names it. Then swap.

Expected: the other group can name or point to each character from the puppet alone. If they can't, the maker adds one more clue next lesson. Note on the class list each child whose puppet was recognised, and any child who will add a clue.

Store puppets flat in a group tray, labelled with the group's name.

Vocabulary

clue, character, puppet, audience, prop

Differentiation

- **More support:** an adult draws a light outline of the character's shape on the card and the child colours and adds clues; or the child chooses from a few ready-made outlines.
- **More challenge:** the child adds a second, smaller clue (Hen's wing, Mouse's whiskers), or gives their puppet a moving part (a paper wing held on with one strip of tape so it flaps).
- **Blind and low-vision children:** use textured materials the child can feel (felt, wool, a card shape cut by an adult); thick dark outlines; the "Can they tell?" check can be done by feel, with the other group describing what they found.
- **Fine-motor needs:** larger card, chunky crayons, an adult or partner holds the card still; the child chooses the clues and colours, and that counts as making the puppet.
- **Colour vision:** the clues are shapes (beak, comb, ears, cheeks), so nobody depends on colour to recognise a character.

⚠ Safety

- Adults do all cutting with adult scissors and all taping to sticks.
- Glue sticks only. If any child still puts small things in their mouth, use only paper scraps, not wool or small fabric pieces.
- Puppets stay below faces while children wait and practise.

Teacher notes

- Talking about what each puppet needs follows the grade 1 theatre standard line about collaborating "to conceptualize costumes and props" (see the unit sources). The point is the talk, not perfect drawings.
- Children may make the same character in very different ways. That is fine, as long as the audience can tell who it is.
- If you have a group of three, one child makes both Hen and Mouse (two puppets, one in each hand, or they swap in the show). A group of five has two Winds.
- Keep the hat props with each group's puppets.

Lesson 4: Change one thing and practise

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Each group agrees one change to the story, adding to each other's ideas, and practises its version with puppets behind the table screen.

Length: about 40 minutes.

Materials

- The teacher's demonstration duck puppet and the teacher's hat prop.
- Each group's tray: four character puppets, their hat prop, role cards and small story cards.
- The table screen (two if you have them).
- Sticky notes and a pen for adults (to draw or write each group's change).
- Any clue scraps, crayons and glue sticks still needed from lesson 3, for puppets that need one more clue.
- A stop signal (bell plus raised hand). A class list for notes.

Steps

✎ Opening (5 min)

1. Any child who is adding a clue from lesson 3 does it now, with help.
2. Tell the class: "Storytellers often change a story a little. Today each group changes **one thing**." Show how ideas can grow, using Duck: "What if the wind blew the hat onto the pond?" Ask a child to add to it with "Yes, and..." (for example "Yes, and Duck swims out to get it!"). Say: "When we say 'yes, and', we keep someone's idea and add to it."

✎ Main activity (25 min)

1. **Choose one change (5 min).** Each group picks one change, using "yes, and" to build on each other's ideas. Offer a short menu if a group is stuck, but their own idea is better:
    - Where does the hat land? (On the pond, on the bakery roof, in the park.)
    - Who finds it? (Hen finds it this time, or all three find it together.)
    - What does Duck do at the end? (Ties the hat on with a ribbon, says a new line.)

    An adult draws or writes the change on a sticky note and puts it on the group's end card. Note on the class list who suggested an idea and who added to someone else's.
2. **Practise (20 min).** Groups take turns behind the table screen, about three minutes each. The adult tells the story slowly while the group moves the puppets and says or signs the lines, including their change. After each run, give one "star" (something that worked, such as "Hen looked so busy searching") and one "wish" (one thing to try, such as "hold Mouse up high enough for us to see"). Groups waiting their turn practise at their own table, holding puppets just above the table edge, with an adult or helper calling the lines.

Hat prop tip: at "Whoosh!", Duck lays the hat prop flat on the table behind the screen, and the finder (Mouse, or whoever finds it in the group's change) picks it up from there. Nobody grabs it from another child's hand.

Remind puppeteers of three tips before the first run:

- Keep your puppet up where the audience can see it, and still when it is not its turn.
- Move the puppet when it talks, so the audience knows who is speaking.
- Show how your character feels by how it moves.

✓ Discussion questions (5 min, with answers)

- "What did your group change?" (Any one change, for example "The hat landed on the pond.")
- "Who added to someone else's idea? What did they add?" (For example "I said the pond, and Sam said a frog finds it.")
- "How can the audience tell which puppet is talking?" (That puppet moves while it talks; the others keep still.)
- "Why change a story?" (To make it new or funny; to make it our own; storytellers often do.)

✓ Closing check (5 min, with answers)

Puppet freeze. Each group shows one moment from its story as a frozen picture behind the screen or at their table: the moment when Duck finds out the hat is gone. Ask each puppeteer, one at a time: "How is your character feeling? Show me with your puppet." Expected: the puppet shows a feeling the child can name or point to (Duck sad or worried, Wind pleased or excited, Hen or Mouse surprised or helpful), shown by how it moves or how it is held.

A child who will take a job in the show (announcer, bell ringer, Wind sound maker) still joins this freeze with their puppet at the table, so outcome 1 is checked for them too.

This is also the second check for outcome 1 for any child noted in lesson 1. Note each group's change and each child's part in it on the class list.

Vocabulary

change, "yes, and", practise, rehearse, audience, star, wish

Differentiation

- **More support:** the group picks a change from the menu; the adult prompts each line; the child moves the puppet while the adult speaks for it.
- **More challenge:** the group adds a new line for one character, or a new character made from a spare card on a stick.
- **Not speaking:** the child's puppet nods or shakes its head; a partner says the line; or the child plays a recorded line on a device.

- **Blind and low-vision children:** tell them where the screen's top edge is and let them feel it; a partner can tap their arm when it is their character's turn.
- **Deaf and hard-of-hearing children:** the adult storyteller faces the group and points to the character whose turn it is.
- **Wheelchair users and seated children:** use the screen set at seated height so everyone in the group holds puppets at the same level.

⚠ Safety

- The table screen stays standing on its feet; nobody stands on chairs.
- Behind the screen, children kneel or sit with space between them; puppets point up and stay below faces.
- Waiting groups keep puppets above their own table edge, not waving near others.

Teacher notes

- Changing one part of the plot follows the grade 1 theatre standard line about contributing "to the adaptation of the plot"; adding to each other's ideas follows the line "build on others' ideas" (see the unit sources).
- "Yes, and" is a simple way to show building on an idea. A child may still say "no" to an idea; the group then looks for one they all like.
- Three minutes per group is tight for six groups. If you have more than four groups, split practice over two days or use two screens with an adult at each.
- Keep the sticky-note change with each group's tray for the show.

Lesson 5: Our puppet show

Unit overview - Previous: Lesson 4

Goal: Each group performs its version of The Hat on the Hill for an audience. Children watch others' shows, spot how puppets showed feelings, and say, sign or show one choice they made.

Length: about 40 minutes (split over two sessions if you have more than six groups or visitors arrive late).

Materials

- Each group's tray: four character puppets, their hat prop, role cards, small story cards and the sticky note with their change.
- The table screen, with chairs or a carpet area for the audience facing it.
- The three large story picture cards (for the one-to-one checks).
- A stop signal (bell plus raised hand). A class list for notes.
- Optional: a small "programme" card listing the groups in order; a tablet or camera for photos of puppets (not faces) if school rules allow.

Steps

✎ Opening (5 min)

1. Set up the screen and the audience area. If visitors come, welcome them and explain in one sentence: "Each group will show the same story, with one change of their own."
2. Agree audience rules with the class: "Watch and listen. Clap at the end. Keep your own puppet still in your lap while others perform."
3. Give the audience a job: "After each show, be ready to tell us one way a puppet showed how it felt."

✎ Main activity (25 min)

1. **The shows (about 4 minutes per group).** An adult or a child announcer says the group's name and their change ("This group's hat lands on the bakery roof"). The adult tells the story slowly while the group moves the puppets and says or signs the lines. The audience joins in with "Whoosh!" and "Not me, not me!" if the group invites them.
2. **After each show (in the same 4 minutes).** Ask one or two audience members: "How did a puppet show how it felt?" (For example "Duck went slow and droopy when the hat blew away.") Then the group takes a bow, and the audience claps.
3. **One-to-one choice check (during the shows).** As each group finishes, a second adult, or the teacher while the next group sets up, asks each puppeteer at the side: "Tell me one thing you chose for your puppet." See the closing check for what counts.

✓ Discussion questions (5 min, with answers)

- "Were the shows all the same?" (No; each group made a different change, and the puppets looked and moved differently.)
- "What helped you know who was talking?" (That puppet moved; the others kept still; the puppeteer used a voice or sign.)
- "What did you enjoy about being a puppeteer, or about watching?" (Any answer; children may pass.)

✓ Closing check (5 min, with answers)

Finish any one-to-one checks not done during the shows. For each child:

1. **Choice (outcome 5).** "Tell me one thing you chose for your puppet." Expected: one real choice about their character, said, signed or shown, such as "I made Hen walk slowly because she is looking carefully", "I gave Mouse a long wool tail", or showing the jump Mouse did when she found the hat.
2. **Story order (outcome 2), only for children noted in lesson 2.** Lay out the three large story cards mixed up. Ask the child to put them in order and tell, sign or show one thing that happens in each part.

Record each child's answers on the class list. Children who did not perform in a puppet role but took a job (announcer, bell ringer, Wind sound maker) answer about the choice they made in that job.

Send puppets home only if your school allows and families want them; otherwise display them with a card naming the story, not the children.

Vocabulary

show, audience, perform, bow, choice, puppeteer

Differentiation

- **More support:** the child performs with a partner holding the puppet with them; the adult gives the child's line and the child moves the puppet. For the choice check, offer two options to point to ("Did you choose Mouse's tail, or how Mouse moved?").
- **More challenge:** the child acts as announcer for one group, or tells the audience what changed in their version and why.
- **Not speaking:** the child shows the choice with the puppet, points to it, signs, or uses their communication device.
- **Blind and low-vision children:** seat them near the screen; an adult or partner gives a short whispered description during other groups' shows if the child wants it.
- **Deaf and hard-of-hearing children:** seat them with a clear view of the storyteller and the puppets; the storyteller faces the audience.
- **Being watched:** any child may perform with a partner, take a job instead, or join for one line only. Nobody performs alone unless they want to.

⚠ Safety

- The table screen stays on its feet; nobody stands on chairs.
- Audience sits back from the screen, leaving a clear path for groups coming and going.
- Photos follow your school's rules; photograph puppets, not children's faces, unless families have given permission.

Teacher notes

- Recalling choices follows the grade 1 theatre standard line "recall choices made in a guided drama experience", and telling the story follows "with prompting and support, tell a short story" (see the unit sources).
- The show is a share, not a test. Praise effort and specific moments, not "the best group".
- If visitors come, keep the share short: two or three groups per session is often enough.
- Keep a few puppets (with the children's agreement) to show next year's class how a stick puppet works.

Grade 2 Arts: Collage and Texture (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 10 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check materials and objects against your school's rules and the class allergy list.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 1. Builds on grade 1: Drawing from looking (rubbings and texture words) and kindergarten Mixing colours, prints and collage, and the arts progression

Big idea

A collage is a new picture made by sticking different pieces together. Artists choose their pieces for how they look and how they feel: a real texture can be touched, while a drawn texture only looks rough or stripy. Trying more than one arrangement, overlapping pieces, and giving old materials a new job are choices, and those choices change how a picture feels.

This is the first arts unit of the grade 2 year (term 1). In kindergarten children tore and stuck paper to make a collage, and in grade 1 they made rubbings and learned texture words. Term 2 of grade 2 moves on to beat, rhythm and tune, and term 3 to a class dance.

Outcomes

By the end of the unit a student can:

1. Describe how at least two materials feel using texture words (rough, smooth, bumpy, stripy, wavy, soft, crinkly, scratchy), and tell a real texture (you can feel it) from a drawn texture (it only looks like one).
2. Make textured papers in at least two ways (a rubbing, a print, drawn marks) and follow the class tidy-up routine for paint and tools.
3. Cut and tear shapes, overlap at least one piece on another, and try at least two arrangements before gluing.
4. Use at least one clean found material for a new job in a collage ("This was a ___. Now it is a ___.").
5. Say one choice they made and why, and say whether a collage feels calm or busy, giving a reason that uses an art word.

Prior knowledge

- From kindergarten arts: tearing and sticking paper to make a collage; colour names; printing with objects.
- From grade 1 arts: crayon rubbings and the texture words bumpy, smooth, rough, stripy and wavy; light and dark marks.
- Some children still find scissors hard; tearing is a real collage technique, and every lesson offers ready-cut shapes.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week. Leave at least a day after lessons 2 and 4 for paint and PVA glue to dry.

Lesson	Title	Main activity
1	Feel it or see it?	Feely bags, sorting by texture words, and a drawn-texture sampler card
2	Making a paper bank	Rubbing, printing and drawn-texture stations, with a tidy-up routine
3	Tear, cut, overlap, try again	Arrange torn and cut pieces for a Little Hill place, try twice, then glue the background
4	Something new from something old	Repurpose found materials to add real texture; calm and busy collages
5	Our collage gallery	Finish and title collages, gallery walk, and partner talk about choices and mood

Materials (whole class unless noted)

- Lesson 1: per table, a feely bag (cloth bag or pillowcase) with a square of fine sandpaper (edges taped), corrugated card, a square of bubble wrap, soft fabric (fleece or felt) and scrunched tissue paper; per table, a texture word card with pictures (bumpy, smooth, rough, stripy, wavy, soft, crinkly, scratchy); per child, a 6-box texture sampler card (A5), pencils, and crayons or felt pens; for the opening, a square of real bubble wrap and a card with drawn bubble-wrap circles; for the closing check, the sandpaper square and a card with drawn zigzag lines; 3-box sampler cards and thick felt pens for support.
- Lesson 2: station A (rubbings): coloured copy paper, peeled wax crayons, masking tape, corrugated card, a plastic mesh, a textured placemat, bubble wrap, large leaves; station B (printing): 2 shallow trays of washable poster paint with thin sponge pads, large plastic bottle tops, corks, sponge pieces, bubble wrap, card strips, A4 paper, aprons, a bowl of water, wipes, paper towels; station C (drawn texture): coloured paper, felt pens, oil pastels, the lesson 1 sampler cards; a drying space; a paper-bank tray with sections "rubbings", "prints" and "drawn"; a tidy-up picture card (lids on; objects in the wash bowl; wipe the table; wash hands); one ready-made rubbing, print and drawn-texture paper for the opening and closing check; big-handled printing objects (a cork, a sponge clipped to a peg) and child-safe gloves for support.
- Lesson 3: the paper bank and plain coloured paper; per child, an A4 background of thin card, child-safe scissors, a glue stick and a named envelope or tray; per table, 4 Little Hill place cards (the park, the pond, Goat's field on the hill, the market); a tablet or camera for the teacher, or per child a small layout card and pencil; for the opening, a paper hill shape, a paper house shape and a board; for the closing check, a card with a tree glued over the edge of a hill; ready-cut shapes (hills, a sun, a tree, a house, a pond) and a torn strip for support.
- Lesson 4: per table, a found materials box (card tube rings cut by an adult, corrugated card scraps, fabric scraps, wool or yarn no longer than 20 cm, old greetings cards, sponge pieces, bubble wrap, fine sandpaper scraps, paper doilies); the lesson 3 collages and envelopes and the paper bank; per table, small pots of PVA glue with spreaders, glue sticks and child-safe scissors; the tidy-up card, a bowl of water, wipes and paper towels; the

drying space; one card tube for the opening; a "calm" and a "busy" collage made by the teacher; ready-cut found materials and child-safe gloves for support.
- Lesson 5: the dry collages, glue sticks and the paper bank; per child, a title card, a pencil, and "Please touch gently" and "Look only" signs; an art word card (texture, real texture, drawn texture, overlap, torn edge, cut edge, repurpose, calm, busy); per child, 2 sticky notes or cards printed "I notice..." and "It feels... because..."; tables set out in a loop at a height every child can reach; the calm and busy collages from lesson 4; word cards to point at for support.
- One-to-one check (week of lesson 5): a square of fine sandpaper and a piece of soft fabric; a square of bubble wrap and the drawn bubble-wrap card; the lesson 3 overlap card (a tree over a hill); the calm and busy collages; the child's own collage.

⚠ Safety and access

Safety (read before lesson 1)

- Washable, non-toxic paint and glue only. Aprons on; wipe spills straight away; wash hands after printing and gluing.
- Child-safe scissors; carry them closed, point down. Adults cut card tubes and anything thicker than thin card.
- Found materials must be clean: no food packaging with food left in it, no egg boxes, nothing sharp, broken or rusty. Sandpaper is fine grade with taped edges.
- No bottle tops, corks, buttons, beads or other small items for children who still mouth objects. Wool lengths stay short (no longer than 20 cm).
- Check fabrics, leaves and other materials against the class allergy list. No feathers, no latex balloons and no food (dried pasta, rice, beans) as collage materials.
- Photos are of artwork only, never of children.

Access and taking part

- **Blind and low-vision children:** this unit suits touch. Use high contrast backgrounds and bold pieces; let children feel every material first; real textures (sandpaper, corrugated card, fabric, bubble wrap) can be told apart by touch. A blind child can arrange pieces by feel and ask a partner to describe colours if they want them.
- **Fine-motor needs:** tearing instead of cutting; ready-cut shapes; glue spreaders; or the child points and an adult or partner places and glues exactly where they say. The choices are still the child's.
- **Children who dislike some textures or sticky hands:** they never have to touch a material they do not want to; offer a pencil end to feel, gloves, glue sticks only, or a partner's help.
- **Colour vision differences:** nothing in the unit depends on telling colours apart; texture and shape carry the meaning.
- **Non-speaking children and children who sign:** answer by pointing to word cards, signing, or choosing between two options.
- **Deaf children:** demonstrate each step before explaining; use a visual signal for changing stations and for tidy-up.
- **Wheelchair users:** stations and the gallery loop at a reachable height, with clear routes between tables.
- No child has to show their collage in the gallery; showing it to the teacher only is fine. A collage counts however it looks, if the child can say or show what they chose.

Assessment

- Lessons 1-4: the teacher notes answers in the closing checks (observe; no writing needed). Children can answer by speaking, signing, pointing or choosing a card.
- Lesson 5: look at the finished collage with the child. Notice whether it has an overlap, at least one real texture and a repurposed material. Collages are not marked for neatness or likeness.
- **One-to-one check (about 3 minutes per child, during the week of lesson 5):**
    1. Hand over the sandpaper and the soft fabric. "Tell me a texture word for each." (For example rough or scratchy, and soft or smooth.)
    2. Show the bubble wrap and the drawn bubble-wrap card. "Which one has a real texture you can feel?" (The bubble wrap.)
    3. Show the overlap card. "Which piece is on top?" (The tree.)
    4. Point to the child's own collage. "Show me one thing you used in a new way. What was its old job?" (Any found material with an old and a new job.) "What did you change when you tried it two ways?" (Any change; "I didn't change anything" is a "with help" if the child then names one thing they could change.)
    5. Show the calm and busy collages. "Which feels calmer? What makes you think so?" (Any choice with a reason that names something in the picture: big pieces, smooth texture, colours, fewer pieces.)
- Record each item as "yes / with help / not yet". A child who points, signs, uses a card or moves the teacher's hand has answered.

Sources

National Core Arts Standards, "Visual Arts at a Glance" (revised), grade 2 column, read from the PDF on 10 November 2026: https://www.nationalartsstandards.org/sites/default/files/2021-11/Visual%20Arts%20at%20a%20Glance%20rev.pdf

The unit uses these grade 2 performance standards as a guide (quoted exactly; the unit is not a full alignment):

- VA:Cr1.2.2a "Make art or design with various materials and tools to explore personal interests, questions, and curiosity." Lessons 3-4.
- VA:Cr2.1.2a "Experiment with various materials and tools to explore personal interests in a work of art or design." Lessons 2-4.
- VA:Cr2.2.2a "Demonstrate safe procedures for using and cleaning art tools, equipment, and studio spaces." Lesson 2 (tidy-up routine), lesson 4.
- VA:Cr2.3.2a "Repurpose objects to make something new." Lesson 4.
- VA:Cr3.1.2a "Discuss and reflect with peers about choices made in creating artwork." Lessons 3 and 5.
- VA:Re8.1.2a "Interpret art by identifying the mood suggested by a work of art and describing relevant subject matter and characteristics of form." Lessons 4-5 (calm and busy).
- VA:Re9.1.2a "Use learned art vocabulary to express preferences about artwork." Lesson 5.

Read for this unit (Wikipedia, 10 November 2026):

- "Collage": https://en.wikipedia.org/wiki/Collage Used for: collage, from the French coller ("to glue" or "to stick together"), makes art from an assembly of different forms, creating a new whole; it may include magazine and newspaper clippings, ribbons, paint, coloured papers, photographs and other found objects. Lesson 3 opening.

- "Texture (visual arts)": https://en.wikipedia.org/wiki/Texture_(visual_arts) Used for: physical (actual or tactile) texture can be felt by touching the surface; visual or implied texture is the illusion of having physical texture. This unit calls these "real texture" and "drawn texture". Lesson 1.

Everything else (the lesson sequence, Little Hill places, materials lists, the calm and busy example collages and the checks) is the author's own example, not from a source.

Known gaps and cautions

- One other agent (Gemini 4 Argon, at 30d74ac) text-checked this unit on 2026-11-10 and reported no errors. That is a text check by an AI agent, not a teacher review or classroom test.
- "Calm" and "busy" are only two mood words; feelings about art differ, and the unit accepts any answer with a reason.
- The unit does not show collages by named artists. Teachers who want to can add public-domain or museum-licensed examples; check the licence first.
- Drying times depend on the paint, glue and room; lessons 3 and 5 may need to move.
- The found-materials list assumes a school can collect clean recycled card and fabric; swap in what is available and safe.

Lesson 1: Feel it or see it?

Unit overview - Next: Lesson 2

About 40 minutes.

Goal

Children describe how materials feel using texture words, and tell the difference between a real texture (you can feel it) and a drawn texture (it only looks bumpy or stripy).

Materials

- Per table: a feely bag (a cloth bag or a pillowcase) holding 5 things: a square of fine sandpaper with its edges taped, a piece of corrugated card, a square of bubble wrap, a piece of soft fabric (fleece or felt) and a ball of scrunched tissue paper.
- Per table: a texture word card with a small picture for each word. Grade 1 words: bumpy, smooth, rough, stripy, wavy. New words: soft, crinkly, scratchy.
- Per child: a "texture sampler" card (A5 card divided into 6 boxes), pencils, and crayons or felt pens.
- For the opening: a real square of bubble wrap and a card with circles drawn on it to look like bubble wrap.
- For the closing check: the sandpaper square and a card with zigzag lines drawn on it.
- For support: a sampler card with 3 bigger boxes; thick felt pens.

Steps

✎ Opening (5 min)

Hold up the real bubble wrap and the drawn bubble-wrap card. "Which one could you pop?" Let two children feel both. "Both look bumpy. Only one is bumpy. The bubble wrap has a **real texture**: you can feel it. The card has a **drawn texture**: it looks bumpy, but it feels flat." Remind the class of grade 1, when they made rubbings and used texture words.

✎ Main activity (25 min)

1. **Feely bag (8 min).** At each table children take turns to put a hand in the bag without looking, feel one thing, and say a texture word for it before pulling it out. The table checks the word card together. Any fair word counts (the tissue can be "crinkly" or "soft").
2. **Sort by feel (7 min).** Tip the 5 things onto the table. The table puts each thing next to the word on the word card that fits it best, then finds one thing that could go with two words ("the corrugated card is bumpy and stripy").
3. **Draw a texture (10 min).** On the sampler card each child fills each box with a different kind of mark: dots, short lines, zigzags, swirls, crosses, little circles. Next to two of the boxes they say (or the teacher writes) what real thing the marks look like

("the dots look like sand", "the circles look like bubble wrap"). Keep the sampler cards for lesson 2.

✓ Discussion questions (5 min, with answers)

1. "Run your finger over your dots. Can you feel bumps?" (No: drawn texture only looks like a texture; the paper is still flat.)
2. "Which thing in the bag felt the most different from the sandpaper?" (Usually the fleece or felt: it is soft and smooth where sandpaper is rough and scratchy. Any reason that uses a texture word counts.)
3. "Why might an artist want a real texture in a picture?" (So people can feel it, or so it catches the light and looks bumpy; any sensible idea.)

✓ Closing check (5 min, with answers)

Hold up the sandpaper and the zigzag card one at a time. "If this has a real texture you can feel, show me a thumb up. If it is a drawn texture, show me a flat hand." (Sandpaper: thumb up. Zigzag card: flat hand.) Then: "Tell your partner one texture word for the sandpaper." (Rough or scratchy; "bumpy" is fine too.)

Vocabulary

texture, real texture, drawn texture, rough, smooth, bumpy, stripy, wavy, soft, crinkly, scratchy

Differentiation

- **Support:** use the 3-box sampler card and thick felt pens; the child can choose a word by pointing to the word card.
- **Extension:** make two boxes that show the same pattern, one lightly and one heavily (a link to light and dark marks from grade 1), and say which looks rougher.
- Children who do not want to touch some materials may use a pencil end to feel, watch a partner, or skip that object; this is fine.

⚠ Safety

- Sandpaper: fine grade only, edges taped. No objects small enough to swallow for children who still mouth things.
- Check the fabric and other items against the class allergy list. No food items in the feely bag.

Teacher notes and misconceptions

- Children often say a drawing of bubble wrap is "bumpy". Agree that it looks bumpy, then ask them to feel it. The aim is the difference between looking and feeling, not a right or wrong word.

- "Drawn texture" is this unit's child-friendly name for what artists also call visual or implied texture.

Lesson 2: Making a paper bank

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 40 minutes.

Goal

Children make their own textured papers in three ways (rubbing, printing and drawn marks) for a class "paper bank", and follow a safe tidy-up routine.

Materials

- **Station A, rubbings (per station):** coloured copy paper, peeled wax crayons, masking tape, and surfaces to rub: corrugated card, a plastic mesh, a textured placemat, bubble wrap and a few large leaves.
- **Station B, printing (per station):** 2 shallow trays of washable poster paint (each with a thin sponge pad in it as a stamp pad); printing objects: large plastic bottle tops, corks, sponge pieces, a square of bubble wrap and short strips of card to print with their edges; A4 paper; aprons; a bowl of water, wipes and paper towels.
- **Station C, drawn texture (per station):** coloured paper, felt pens, oil pastels, and the children's lesson 1 sampler cards as ideas.
- A drying space (a drying rack, or a clear table or floor area with newspaper) and a large tray or box with three sections labelled "rubbings", "prints" and "drawn" (the class paper bank).
- A tidy-up picture card with 4 steps: lids on; objects in the wash bowl; wipe the table; wash hands.
- For the opening: one finished paper of each kind (a rubbing, a print, a drawn texture) made before the lesson.
- For the closing check: the same three papers.
- For support: printing objects with a big handle (a cork, a sponge clipped to a peg), and a child-safe glove for any child who does not want paint on their hands.

Steps

✎ Opening (5 min)

Show the three ready-made papers. "These are going into our paper bank. In lesson 3 you will cut and tear them to make a picture." Ask how each one might have been made, then name them: a **rubbing** (crayon over a bumpy thing), a **print** (pressing a painted object onto paper) and a **drawn texture**. Go through the tidy-up card together and practise the actions in the air.

✎ Main activity (25 min)

Split the class into three groups. Each group spends about 8 minutes at each station, moving on when the teacher gives the signal.

1. **Station A, rubbings.** Tape the paper over a surface, then rub with the side of a peeled crayon. Try two surfaces on one sheet, or one surface in two colours.
2. **Station B, printing.** Press an object onto the sponge pad, then onto the paper. Repeat it to make a pattern, or mix two objects. An adult stays at this station.
3. **Station C, drawn texture.** Fill a whole sheet with one kind of mark from the sampler card (all dots, all swirls...) so it can be cut up later.

At each change, the group leaving station B does the tidy-up card steps. Every child puts finished papers in the paper bank (prints go to the drying space first). Write initials lightly on the back so children can find them, though papers are shared.

✓ Discussion questions (5 min, with answers)

1. "Which paper was made by pressing paint?" (The print.)
2. "Which one shows the shape of something real, like a leaf or a mesh?" (The rubbing, and some prints. The drawn texture was made up by the artist.)
3. "Why do we wipe the table and put objects in the wash bowl?" (So paint does not get on other people's work or clothes, and the things are ready to use again.)

✓ Closing check (5 min, with answers)

Hold up the three opening papers in a new order. "Point to the rubbing. Point to the print. Point to the drawn texture." (Teacher checks pointing.) Then: "Show me one step of tidying the printing table." (Any step on the card: lids on, objects in the wash bowl, wipe the table, wash hands.)

Vocabulary

rubbing, print, drawn texture, pattern, paper bank, tidy up

Differentiation

- **Support:** use the big-handled printing objects; an adult can hold the paper still for rubbing.
- **Extension:** make a paper with two kinds of texture on it, one on top of the other (a rubbing with prints over it).
- A child who does not want to use paint can make two drawn papers or two rubbings instead.

⚠ Safety

- Washable, non-toxic paint only. Aprons on. Wipe spills straight away so nobody slips.

- Bottle tops and corks only for children who do not put things in their mouths; otherwise use sponge pieces and card strips.
- Leaves: check for anything sharp or prickly, and avoid plants the school lists as irritants. Wash hands after.

Teacher notes and misconceptions

- Some children think every sheet must be a finished picture. Explain that these are "making papers": they will be cut up.
- Prints may need to dry overnight before lesson 3.

Lesson 3: Tear, cut, overlap, try again

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 40 minutes.

Goal

Children cut and tear shapes from the paper bank, overlap them, and try at least two different arrangements before choosing one for a collage of a place in Little Hill.

Materials

- The class paper bank from lesson 2, plus some plain coloured paper.
- Per child: a background sheet of thin card (A4, one colour), child-safe scissors, a glue stick, and a named envelope or tray to keep loose pieces.
- Per table: 4 "Little Hill place" picture cards (the park, the pond, Goat's field on the hill, the market), drawn simply.
- A tablet or camera for the teacher to photograph first arrangements, or per child a small "layout card" (a quarter of A4) and a pencil for a quick sketch instead.
- For the opening: a large hill shape and a small house shape cut from paper, and a board to arrange them on.
- For the closing check: an example card with a tree shape glued over the edge of a hill shape.
- For support: shapes cut out in advance (hills, a sun, a tree, a house, a pond); a short torn strip to show a torn edge.

Steps

✎ Opening (5 min)

Put the hill and the house on the board side by side. Then slide the house so that it covers part of the hill. "Now the house is **overlapping** the hill. Which one is on top?" (The house.) Tear a strip and cut a strip: "A **torn edge** is soft and fuzzy. A **cut edge** is sharp and straight. Artists choose which one they want." Tell the class that collage comes from a French word meaning "to glue" or "to stick together", but today nothing gets glued until they have tried it two ways.

✎ Main activity (25 min)

1. **Choose a place (2 min).** Each child picks one Little Hill place card, or a made-up place of their own.
2. **Big pieces first (8 min).** Tear or cut the biggest shapes (sky, ground, hill, pond) from the paper bank. Lay them on the background without glue.
3. **Smaller pieces (7 min).** Add smaller shapes (trees, a house, Duck, a kite). Overlap at least one piece on another.

4. **Try again (5 min).** The teacher photographs the arrangement (or the child sketches it on the layout card). Then each child changes at least one thing: moves a piece, swaps a paper for a different texture, or changes what overlaps what. Compare: "Which way do you like better?"
5. **Stick the background (3 min).** When they have chosen, children glue only the biggest background pieces. Small pieces go in the envelope for lesson 4.

✓ Discussion questions (5 min, with answers)

1. "What did you change when you tried again?" (Any change: a moved piece, a different paper, a new overlap.)
2. "When would you use a torn edge?" (For soft things such as clouds, bushes or a hill; any reason counts.)
3. "If the tree overlaps the hill, which is nearer to us in the picture?" (Usually the tree: things on top often look closer.)

✓ Closing check (5 min, with answers)

Show the example card. "Which piece is on top? Tell your partner how you know." (The tree. You can see all of the tree, and it hides part of the hill.)

Vocabulary

collage, overlap, on top, behind, torn edge, cut edge, arrange, background

Differentiation

- **Support:** use the ready-cut shapes; a child can point and an adult or partner places pieces exactly where the child says.
- **Extension:** make one overlap with three layers (sky, hill, tree), or tear a piece so its torn edge shows a white rim on purpose.
- Tearing is a real collage technique; a child who finds scissors hard can tear everything.

⚠ Safety

- Child-safe scissors; carry them closed, point down. Glue sticks only in this lesson.

Teacher notes and misconceptions

- Children may glue each piece the moment it is placed. Keep glue sticks in a tray until step 5.
- Photos are only of the artwork, never of children.

Lesson 4: Something new from something old

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 40 minutes.

Goal

Children give clean, found materials a new job in their collage, adding at least one real texture, and talk about how a collage can feel calm or busy.

Materials

- Per table, a "found materials" box of clean, safe recycled things: card tube rings (cut by an adult), corrugated card scraps, fabric scraps, lengths of wool or yarn (no longer than 20 cm), old greetings cards, sponge pieces, bubble wrap, fine sandpaper scraps, and paper doilies.
- The children's collages and envelopes from lesson 3, and the paper bank.
- Per table: small pots of PVA (white) glue with glue spreaders, glue sticks, child-safe scissors.
- The tidy-up picture card from lesson 2, a bowl of water, wipes and paper towels.
- A drying space (as in lesson 2).
- For the opening: one card tube.
- For the discussion: two collages made by the teacher before the lesson: a "calm" one (a few big smooth pieces in blues and greens) and a "busy" one (many small bright pieces with zigzags and bumpy textures).
- For the closing check: nothing extra (children use their own collages).
- For support: found materials already cut to small sizes, and child-safe gloves.

Steps

✎ Opening (5 min)

Hold up the card tube. "What job did this have before?" (It held kitchen roll or toilet paper.) "What could it be in a picture?" (A tree trunk, a chimney, a tunnel, a ring for a sun.) "Using an old thing for a new job is called **repurposing**. Today you will repurpose at least one thing in your collage."

✎ Main activity (25 min)

1. **Look and choose (5 min).** Children look through the found materials box and choose things that could become part of their place (wool for a kite string, bubble wrap for pond water, sandpaper for a path).
2. **Add and arrange (12 min).** Place the lesson 3 small pieces and the found materials on the collage. Try them before gluing, as in lesson 3. Each collage includes at least one real texture you can feel.
3. **Stick (5 min).** Glue sticks for paper; PVA and a spreader for heavier things (fabric, card, sponge). Use a little glue.

4. **Tidy up (3 min).** Follow the tidy-up card. Collages go flat to dry.

✓ Discussion questions (5 min, with answers)

Show the two teacher collages.

1. "Which one feels calm? Which one feels busy?" (Usually the big smooth blue-green one feels calm and the zigzag one feels busy, but feelings can differ: any answer with a reason counts.)
2. "What makes it feel that way?" (Big or small pieces, smooth or bumpy textures, colours, lots of pieces or a few.)
3. "Which found thing had the most surprising new job?" (Any.)

✓ Closing check (5 min, with answers)

Each child points to one repurposed thing in their collage and tells their partner: "This was a ___. Now it is a ___." (Any old job and new job, for example "This was a tube. Now it is a chimney.") The teacher listens in.

Vocabulary

repurpose, found materials, real texture, calm, busy, mood

Differentiation

- **Support:** use ready-cut found materials; the child points and a partner or adult glues where they say.
- **Extension:** make the collage feel calm or busy on purpose, and say which choices they made to do it.
- A child who does not want to touch glue or some materials can use a glue spreader, gloves, or glue sticks only.

⚠ Safety

- Only clean materials: no food packaging with food left in it, no egg boxes, nothing sharp, broken or rusty. Adults cut card tubes.
- No buttons, beads or other small items for children who still mouth things. Wool lengths stay short. No feathers or latex balloons (common allergies).
- Washable PVA only; wash hands after.

Teacher notes and misconceptions

- Some children add everything in the box. Ask: "Does this help show your place?"
- Thick PVA pieces can take a day to dry; plan lesson 5 for at least a day later.

Lesson 5: Our collage gallery

Unit overview - Previous: Lesson 4

About 40 minutes.

Goal

Children finish and title their collage, visit a class gallery, and use art words to talk about choices they made and the mood of a collage.

Materials

- The children's collages from lesson 4 (dry), glue sticks, and the paper bank for small finishing touches.
- Per child: a small title card, a pencil, and two small signs to choose from: "Please touch gently" and "Look only".
- An art word card for the board: texture, real texture, drawn texture, overlap, torn edge, cut edge, repurpose, calm, busy.
- Per child: 2 sticky notes or small cards printed with "I notice..." and "It feels... because...".
- Tables cleared and set out in a loop for the gallery, with collages laid flat at a height every child can reach and see.
- For the closing check: the "calm" and "busy" teacher collages from lesson 4.
- For support: small word cards (the art words) to point at.

Steps

✎ Opening (5 min)

Read the art word card together and do an action for each word (rub fingertips for texture, cross two hands for overlap). "Today you are artists showing your work. You choose whether people may touch it gently or only look."

✎ Main activity (25 min)

1. **Finish and title (8 min).** Children add any small last piece, write or say a title (the teacher can scribe), and choose a "touch gently" or "look only" sign.
2. **Gallery walk (10 min).** Children walk the loop with their two notes, stop at two collages that are not their own, and leave one note on each, or tell the artist out loud. Collages are visited only if the artist agreed to show them (see Access in the unit overview).
3. **Partner talk (7 min).** In pairs, each artist tells their partner one choice they made: "I chose ___ because ___." (For example "I chose bubble wrap for the pond because it looks like ripples.") The partner says one thing about the mood: "It feels ___ because ___."

✓ Discussion questions (5 min, with answers)

1. "Which art word did you hear most in the gallery?" (Any.)
2. "Did anyone's collage feel different to you from what the artist meant?" (This can happen: people can feel different things about the same picture, and both can have good reasons.)
3. "If you made another collage, what would you change?" (Any.)

✓ Closing check (5 min, with answers)

Hold up the calm and busy collages one at a time. "Show me still hands if this one feels calm, wiggly fingers if it feels busy." (Most children will show calm for the big smooth one and busy for the zigzag one; a different answer with a reason is fine.) Then: "Tell your partner one art word that fits your own collage." (Any word from the card used sensibly.)

Vocabulary

gallery, title, choice, mood, calm, busy, plus the words on the art word card

Differentiation

- **Support:** children choose a word card to point at instead of speaking; an adult scribes titles and notes.
- **Extension:** write two sentences on the back of the title card about how they made one part of the collage.
- A child can share their collage with the teacher only; this still counts.

⚠ Safety

- Keep walkways clear for the gallery loop. Collages with "look only" are not touched.

Teacher notes and misconceptions

- Children may say a collage is "good" or "bad". Turn it into art words: "What do you notice? How does it feel?"
- Do the one-to-one check (see the unit overview) during this week.

Grade 2 Arts: Beat, Rhythm and Tune (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 11 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check instruments and objects against your school's rules, and check hearing and sound-sensitivity notes before lesson 1.
>
> Text-checked by one other agent (Gemini 4 Carbon); see Known gaps.

Back to the grade 2 year plan - Term 2. Builds on grade 1: Beat, rhythm, high and low, and a round (ta and ti-ti cards, so-mi calls) and kindergarten Lines, colours and a steady beat, and the arts progression

Big idea

Music has a steady beat, and beats often come in groups: some music feels like "ONE two, ONE two" (a march) and some like "ONE two three, ONE two three" (a sway). A rhythm can include a beat with no sound in it, and we can write that silence down too. A short pattern that keeps repeating under a song (an ostinato) can make the song bigger. Tunes move between higher and lower notes; so, mi and la are three of them. Musicians choose how fast and how loud to play to suit what the music is for.

This is the second arts unit of the grade 2 year (term 1 was collage and texture). In grade 1 children clapped ta and ti-ti picture cards, sang so-mi calls and sang a two-part round. Term 3 of grade 2 moves on to a class dance.

Outcomes

By the end of the unit a student can:

1. Move or pat along to a steady beat and say whether teacher-played music is grouped in twos (STRONG-weak) or threes (STRONG-weak-weak).
2. Read and clap a four-beat card using ta, ti-ti and "sh" (a beat with no sound), and make and record their own four-beat card that includes at least one "sh".
3. Keep an ostinato going (by clapping, speaking or playing) while others sing a song.
4. Tell which of two notes is higher, and make and play or sing a four-beat tune using so, mi and la.
5. With a group, choose a speed (tempo) and loudness (dynamics) to suit a purpose (a lullaby or a march), perform for the class, and give one reason for a choice.

Prior knowledge

- From kindergarten arts: keeping a steady beat by walking and patting; loud and quiet sounds.
- From grade 1 arts: "ta" (one big footprint, a walking step) and "ti-ti" (two small footprints, two running steps) picture cards; four-beat cards; high and low notes, so-mi echo calls; singing in two parts.

- Not every child sings in tune yet, and that is normal at this age. The unit never assesses singing in tune; see Assessment and Access.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week. Keep the song chart and the rhythm cards up on the wall for the whole unit.

Lesson	Title	Main activity
1	Beats in twos and threes	March to STRONG-weak, sway to STRONG-weak-weak, sort teacher-played patterns, partner guessing game
2	Ta, ti-ti and a quiet beat	Meet the "sh" card (a beat with no sound) and standard notation, read four-beat cards, make your own card with a rest
3	A pattern that keeps going	Learn the song "Little Hill Market", then keep an ostinato going under it in two groups
4	So, mi and la	Echo so-mi-la patterns with hand heights, find la in the song, make and play a four-beat tune card
5	Music for a purpose	Groups turn the song into a lullaby or a march, rehearse with a checklist, perform and explain choices

Materials (whole class unless noted)

- Every lesson: a hand drum and soft beater; a "stop" signal (a raised hand, or a picture card held up); ear defenders and a quiet spot at the edge of the room; a clear space for moving.
- Lesson 1: two large cards, "twos" (one big dot, one small dot) and "threes" (one big dot, two small dots), plus tactile copies (big and small felt circles); a list of 6 drum patterns for the teacher (in the lesson).
- Lesson 2: the grade 1 large rhythm cards (ta: one big footprint; ti-ti: two small footprints) and a new large "sh" card (an empty footprint outline); the same three cards with standard notation printed underneath (a quarter note, two eighth notes joined by a beam, a quarter rest); six large four-beat cards A-F (patterns in the lesson); per child, a strip of card with four boxes, a small set of 4 ta, 4 ti-ti and 2 sh cards, a glue stick and a pencil; tactile cards (big felt circle = ta, two small felt circles = ti-ti, felt ring = sh) and tactile copies of cards A-F.
- Lesson 3: a song chart of "Little Hill Market" (words, with the rhythm cards under each line); a tuned instrument with G, E and A (chime bars, a xylophone or a glockenspiel) to give the starting note; two large ostinato cards, A ("Ap-ples, ap-ples, bread, bread": ti-ti ti-ti ta ta) and B ("Buy, buy, buy, sh": ta ta ta sh), with tactile copies; untuned percussion for half the class (wooden blocks, claves, hand drums, sealed shakers).
- Lesson 4: the tuned instrument and the song chart; a large three-line "ladder" card (top line la, middle line so, bottom line mi) with a movable counter; per group of about 4, three chime bars (G, E, A) or a xylophone with only those bars left on, and beaters; per child, a tune card with four ladders side by side and 4 counters or a pencil; a raised-line tune card and counters with a bump on top for children who need them; a screen or large book to hide the instrument for the closing check.
- Lesson 5: the song chart, ostinato cards A and B, the untuned percussion and the tuned instruments; per group, a choice card (picture of Paper Bear in bed for a lullaby, or of a Little Hill parade for a march; boxes to tick for slow or fast, quiet or loud, ostinato A or B, and which instruments) and the group's tune cards from lesson 4; a large performance

checklist (steady beat; start and stop together; our choices fit the purpose); a "We played it ___ and ___ because ___" sentence card.
- One-to-one check (week of lesson 5): the hand drum; card D from lesson 2 and its tactile copy; the "sh" card; the tuned instrument and the screen; the child's group choice card.

⚠ Safety and access

Safety (read before lesson 1)

- Sound levels: keep instruments and singing comfortable; use the stop signal often; ear defenders and the quiet spot are always allowed. Never play a loud sound close to anyone's ear. In lesson 5, loud means "strong", not as loud as possible.
- Voices: sing gently in a comfortable middle range (this song stays between E and A above middle C). Stop if a voice hurts.
- Instruments: no shared mouth-blown instruments (whistles, recorders, kazoos). Shakers must be sealed; check nothing small can come out. Beaters are for instruments only; carry them pointing down. Check that beaters and drum heads are latex-free if anyone has a latex allergy.
- Moving: march and sway in the same direction around the space; stop on the signal; leave space for wheelchairs and walking frames.

Access and taking part

- **Deaf and hard-of-hearing children:** show the beat with a big visible movement (the hand drum held up, a nodding head, the teacher's beater arm); let children put a hand flat on the drum or on a wooden floor to feel the strong beats; use the twos and threes cards and the rhythm cards so they can join in by watching. Pitch can be shown on the tuned instrument (shorter bars play higher) and with hand height. Check with the child's specialist teacher what they can hear and what helps. Children who cannot hear pitch differences are not marked down on pitch.
- **Blind and low-vision children:** tactile rhythm cards (big felt circle = ta, two small felt circles = ti-ti, felt ring = sh); a raised-line ladder card with bump counters; a partner says "start" and "stop" as well as the signal; chime bars set out in a fixed order (E, G, A from left to right) so the child can find them by touch.
- **Children who do not sing or speak:** hum, play an instrument, clap, do the actions, point to cards, sign or use their communication device. Singing alone is never required.
- **Children with limited hand movement:** pat with elbows or feet, nod, or tap with one finger; a beater with a thick grip; a partner holds the instrument; the child points and a partner places their rhythm or tune cards exactly where they say. The choices are still the child's.
- **Wheelchair users:** marching and swaying can be tapping the armrests, wheeling forward and back, or swaying the upper body.
- **Sound-sensitive children:** ear defenders, the quiet spot, quieter instruments (wooden blocks or claves rather than tambourines or cymbals), and the choice to be the conductor who holds up the cards or the stop signal.
- No child has to perform alone. In lesson 5 every child performs as part of a group, and a child may choose to be the conductor or to perform for the teacher only.

Assessment

- Lessons 1-4: the teacher notes answers in the closing checks (observe; no writing needed). Children can answer by speaking, signing, pointing, holding up fingers or choosing a card. Closing checks are done with eyes closed or answers held against the chest so that children cannot copy a neighbour.
- Lesson 5: watch each group's performance against the class checklist, and note one reason from each child (spoken, signed, pointed to on the sentence card, or said for them and agreed).
- Singing in tune is never assessed.
- **One-to-one check (about 3 minutes per child, during the week of lesson 5):**
    1. Play 8 beats of threes on the hand drum (STRONG-weak-weak). "Pat along with me. Is it twos or threes?" (Threes. A child who pats a steady beat but says "twos" is "with help"; play twos next and compare.)
    2. Show card D (ta, ti-ti, sh, ta). "Clap this card." (Clap, two quick claps, no sound on the third beat, clap. Hands apart in silence on "sh" counts.)
    3. Point to the "sh" card. "What do we do on this beat?" (Nothing: it is a beat with no sound, a rest. We keep counting it.)
    4. "I will sing the song. You keep ostinato A going." Sing line 1 and line 2 of "Little Hill Market". (The child keeps "Ap-ples, ap-ples, bread, bread" going, by clapping, speaking or tapping, without stopping or joining the song. Small wobbles are fine.)
    5. With the instrument hidden, play G then A. "Did it go up or down?" (Up. A hand moving up counts.) Then play A then E. (Down.)
    6. Show the child's group choice card. "Was your music a lullaby or a march? Tell me one thing you chose and why." (Any choice with a reason linked to the purpose, for example "slow and quiet so Paper Bear can sleep", "loud so the parade can hear".)
- Record each item as "yes / with help / not yet". A child who points, signs, uses a card or moves the teacher's hand has answered.

Sources

National Core Arts Standards, "Music at a Glance" (revised), grade 2 column, read from the PDF on 11 November 2026: https://www.nationalartsstandards.org/sites/default/files/Music%20at%20a%20Glance%20rev.pdf

The unit uses these grade 2 performance standards as a guide (quoted exactly; the unit is not a full alignment):

- MU:Cr1.1.2a "Improvise rhythmic and melodic patterns and musical ideas for a specific purpose." Lessons 4-5.
- MU:Cr1.1.2b "Generate musical patterns and ideas within the context of a given tonality (such as major and minor) and meter (such as duple and triple)." Lesson 1 (twos and threes), lessons 2 and 4.
- MU:Cr2.1.2a "Demonstrate and explain personal reasons for selecting patterns and ideas for music that represent expressive intent." Lesson 5.
- MU:Cr2.1.2b "Use iconic or standard notation and/or recording technology to combine, sequence, and document personal musical ideas." Lessons 2 and 4 (the child's own rhythm card and tune card).
- MU:Pr4.2.2a "Demonstrate knowledge of music concepts (such as tonality and meter) in music from a variety of cultures selected for performance." Lesson 1, partly (see Known gaps).

- MU:Pr4.2.2b "When analyzing selected music, read and perform rhythmic and melodic patterns using iconic or standard notation." Lessons 2-4.
- MU:Pr4.3.2a "Demonstrate understanding of expressive qualities (such as dynamics and tempo) and how creators use them to convey expressive intent." Lesson 5.
- MU:Pr5.1.2a "Apply established criteria to judge the accuracy, expressiveness, and effectiveness of performances." Lesson 5 (the class checklist).
- MU:Pr6.1.2a "Perform music for a specific purpose with expression and technical accuracy." Lesson 5.
- MU:Pr6.1.2b "Perform appropriately for the audience and purpose." Lesson 5.

Read for this unit (Wikipedia, 11 November 2026):

- "Metre (music)": https://en.wikipedia.org/wiki/Metre_(music) Used for: metre refers to regularly recurring patterns and accents such as downbeats and beats. Lesson 1 calls these "twos" and "threes" and "strong" and "weak" beats.
- "Rest (music)": https://en.wikipedia.org/wiki/Rest_(music) Used for: a rest is the absence of a sound for a defined period of time, or the sign that shows it; each rest is named for the note value it matches (quarter note and quarter rest). Lesson 2.
- "Ostinato": https://en.wikipedia.org/wiki/Ostinato Used for: an ostinato (from the Italian for "stubborn") is a motif or phrase that persistently repeats in the same musical voice, frequently in the same pitch. Lesson 3.
- "Tempo": https://en.wikipedia.org/wiki/Tempo Used for: tempo is the speed or pace of a piece of music, and is often also an indication of its character. Lesson 5.
- "Dynamics (music)": https://en.wikipedia.org/wiki/Dynamics_(music) Used for: dynamics is the variation in loudness between notes or phrases; dynamics help communicate a feeling; dynamic markings are always relative. Lesson 5.

The song "Little Hill Market", the two ostinatos, the drum patterns, the four-beat cards and the lullaby and march purposes are written for this unit (CC0). The ta and ti-ti syllables and the so-mi start come from the grade 1 unit, which cites the Wikipedia article on the Kodály method. Everything else (the lesson sequence, the choice of so, mi and la on G, E and A, materials and checks) is the author's own example, not from a source.

Known gaps and cautions

- One other agent (Gemini 4 Carbon, at c5c922d) text-checked this unit on 2026-11-11 and reported no errors. That is a text check by an AI agent, not a teacher review or classroom test. Gemini 4 Argon also reported a link and build check (0 broken links) the same day.
- No recordings or music from named cultures are supplied, so MU:Pr4.2.2a ("music from a variety of cultures") is only partly met. Teachers can add licensed recordings of marches, lullabies and waltzes from different places and ask "twos or threes?"; check the licence first.
- The key (so = G) and the order of so, mi, then la are the author's choices. A trained music teacher will know more about singing range and sequence; move the song up or down to suit the class.
- Timings are untested. Lesson 3 (learning a new song and an ostinato in one lesson) and lesson 5 (group rehearsal and performance) are the most likely to run over; lesson 5 performances can move to another day.
- Not all children sing in tune at seven, and some cannot hear pitch differences; neither is assessed. The pitch check accepts hand height.
- "Twos" and "threes" are a simplification: real music can change metre or group beats in other ways. The unit only uses steady twos and threes.

- Lesson 5 offers only two purposes (a lullaby and a march). Others work as well (music for a rainy day, for tidying up).

Lesson 1: Beats in twos and threes

Unit overview - Next: Lesson 2

About 40 minutes.

Goal

Children feel that beats are often grouped, and tell music in twos (STRONG-weak, like a march) from music in threes (STRONG-weak-weak, like a sway) by moving, patting and listening.

Materials

- A hand drum and soft beater; the stop signal.
- Two large cards: "twos" (one big dot, one small dot) and "threes" (one big dot, two small dots). Tactile copies with big and small felt circles.
- The list of drum patterns below.
- Ear defenders and a quiet spot; a clear space for moving.

Steps

✎ Opening (5 min)

Children stand in a space. "Walk to my drum." Play a steady beat; stop on the signal; play again a little faster, then slower. Remind the class of grade 1: the **beat** is steady, like walking. "Today we will find out that beats like to go in groups."

✎ Main activity (25 min)

1. **March in twos (8 min).** Play the drum STRONG-weak, STRONG-weak (a big hit, then a small one), counting "ONE two, ONE two". Children march around the room, stamping gently on ONE and stepping lightly on two. Stop on the signal. Then, standing or sitting, they **pat-clap**: pat knees on ONE, clap on two. Hold up the "twos" card: "One big dot for the strong beat, one small dot for the weak beat."
2. **Sway in threes (7 min).** Play STRONG-weak-weak, counting "ONE two three". Children stand still and sway: lean to one side on ONE, stay there on two and three, then lean the other way on the next ONE. Then **pat-clap-clap**: pat on ONE, clap on two and three. Hold up the "threes" card.
3. **Twos or threes? (6 min).** Play each pattern in the list below. The class joins in with pat-clap or pat-clap-clap as soon as they can tell; then the teacher points to the two cards and children point to the one that fits. Play each one again if the class is split.
4. **Partner game (4 min).** In pairs, one child pats twos or threes on their knees (strong pats louder) and the partner says or points to which it is. Swap.

Drum patterns for step 3 (play each for about 12 beats; count in your head, not aloud):

Pattern	Play	Answer
1	STRONG-weak, slowly	twos

Pattern	Play	Answer
2	STRONG-weak-weak, slowly	threes
3	STRONG-weak-weak, faster	threes
4	STRONG-weak, faster	twos
5	STRONG-weak, quietly	twos
6	STRONG-weak-weak, quietly	threes

✓ Discussion questions (5 min, with answers)

1. "Which was better for marching, twos or threes? Why?" (Usually twos: we have two feet, left-right. Any answer with a reason counts.)
2. "Was pattern 3 still threes when I played it faster?" (Yes. Speed does not change how the beats are grouped.)
3. "How did you know which beat was the strong one?" (It was louder or bigger; it was where we patted; it felt like the start of the group.)

✓ Closing check (5 min, with answers)

Children close their eyes (or turn away, or look at the floor). "Hold your answer against your chest: one finger for twos, three fingers for threes." Play 12 beats of STRONG-weak-weak. (Threes: three fingers.) Then play 12 beats of STRONG-weak at a different speed. (Twos: one finger.) Note who answers each correctly.

Vocabulary

beat, strong beat, weak beat, twos, threes, march, sway

Differentiation

- **Support:** the child keeps a hand on the drum while it is played, or watches the teacher's beater arm (big swing for STRONG). Patting only on ONE is a good start.
- **Extension:** count the groups aloud ("ONE two three, ONE two three") and try clapping on the weak beats only; or in the partner game, change from twos to threes partway and see if the partner notices.
- Children who prefer not to march can pat-clap in their space.

⚠ Safety

- Everyone moves in the same direction; stop on the signal. Gentle stamps only.
- Keep the drum at a comfortable level; never play close to a child's ear.

Teacher notes and misconceptions

- Children often think faster means "more beats in a group". Pattern 3 and the discussion show that speed and grouping are different things.

- Loud and strong are linked here on purpose (the strong beat is played louder), but in lesson 5 loudness becomes a choice for the whole piece.
- Music theory calls twos "duple metre" and threes "triple metre". These words are for the teacher; children use "twos" and "threes".
- If the class finds threes hard, do more swaying before patting. Some children feel threes more easily with the whole body (a teaching suggestion, not from a source).

Lesson 2: Ta, ti-ti and a quiet beat

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 40 minutes.

Goal

Children read and clap four-beat cards with ta, ti-ti and a new card, "sh", for a beat with no sound (a rest). They see the same rhythms in standard notation, and each child makes and records their own four-beat card with at least one rest.

Materials

- The hand drum and the stop signal.
- The grade 1 large rhythm cards: ta (one big footprint) and ti-ti (two small footprints). A new large "sh" card: an empty footprint outline.
- The same three cards with standard notation printed underneath: a quarter note under ta, two eighth notes joined by a beam under ti-ti, and a quarter rest under sh.
- Six large four-beat cards (each beat in its own box):
  - A: ta, ta, ti-ti, ta
  - B: ta, sh, ta, sh
  - C: ti-ti, ti-ti, ta, sh
  - D: ta, ti-ti, sh, ta
  - E: ti-ti, ta, ti-ti, ta
  - F: sh, ta, ti-ti, ta
- Per child: a strip of card with four boxes; a small set of 4 ta, 4 ti-ti and 2 sh cards; a glue stick; a pencil.
- Tactile cards: big felt circle = ta, two small felt circles = ti-ti, felt ring (an outline with nothing inside) = sh; tactile copies of cards A-F.
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

Hold up card A. "Who remembers these from grade 1?" Clap it together, then say it ("ta, ta, ti-ti, ta"). Now hold up the "sh" card. "This footprint is empty. Nobody stepped there. What do you think we do?" Show the answer: on "sh", hands move apart, palms up, with no sound, and we can whisper "sh". "It is still a beat. We just don't make a sound. Musicians call it a **rest**."

✎ Main activity (25 min)

1. **Read the cards (10 min).** Play a steady beat quietly on the drum. The class claps cards A to F in turn, opening hands silently on each "sh". After each card, turn it over to show the standard notation version underneath. "Many musicians read these signs: this

is a quarter note, these are two eighth notes, and this squiggle is a quarter rest." Point to each beat as it is clapped.
2. **Make a card (10 min).** Each child chooses 4 small cards, including at least one "sh", and lays them in the four boxes on their strip. They clap it quietly to themselves, change it if they want, then glue it down and write their name on the back. Children who want to can also draw the notation signs under their footprints.
3. **Swap and clap (5 min).** In pairs, each child claps their partner's card. If it does not sound right, the owner shows how it goes.

✓ Discussion questions (5 min, with answers)

1. "On a 'sh' beat, do we stop counting?" (No. The beat is still there; we just don't make a sound.)
2. "Card B and card D both have rests. Which one has two rests?" (Card B: ta, sh, ta, sh.)
3. "Why might a musician want a rest?" (To breathe; to make the music bouncy or surprising; to let someone else play; any sensible idea.)

✓ Closing check (5 min, with answers)

Put cards B and D at the front, labelled 1 (B) and 2 (D). "I will clap one card. Look at the cards, not at your friends. Hold your answer against your chest: one finger for card 1, two fingers for card 2." Clap card D (ta, ti-ti, rest, ta). (Two fingers.) Then clap card B (ta, rest, ta, rest). (One finger.) Keep the children's cards; they can go up on the wall.

Vocabulary

beat, rhythm, ta, ti-ti, rest ("sh"), quarter note, eighth notes, quarter rest, notation

Differentiation

- **Support:** start with a strip of 2 boxes, then 4; use the tactile cards; the teacher keeps the drum beat going while the child claps.
- **Extension:** make an 8-beat card (two strips); write the card only in standard notation and ask a partner to read it.
- Children with limited hand movement can tap, nod, or point to each beat as a partner claps.

⚠ Safety

- Child-safe glue sticks only.
- Keep claps gentle; ear defenders are always allowed.

Teacher notes and misconceptions

- The most common mistake is to skip the rest and clap the next beat early. Keep the drum beat going so children can hear the silent beat passing. Opening the hands on the rest gives the silence a movement.
- Some children think "sh" means "say sh loudly". The whisper is optional; the point is silence.
- The rest here lasts one beat (a quarter rest). Other rests come later.
- In British English a quarter note is a crotchet and an eighth note is a quaver.

Lesson 3: A pattern that keeps going

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 40 minutes.

Goal

Children learn a new song, "Little Hill Market", and keep a short repeating pattern (an ostinato) going underneath it while others sing.

Materials

- The hand drum and the stop signal.
- A song chart of "Little Hill Market" (below), with the rhythm cards under each line.
- A tuned instrument with G, E and A (chime bars, a xylophone or a glockenspiel) to give the starting note.
- Two large ostinato cards with tactile copies:
  - A: "Ap-ples, ap-ples, bread, bread" (ti-ti, ti-ti, ta, ta)
  - B: "Buy, buy, buy, sh" (ta, ta, ta, rest)
- Untuned percussion for half the class: wooden blocks, claves, hand drums, sealed shakers.
- Ear defenders and a quiet spot.

The song: "Little Hill Market"

Written for this unit (CC0). Four lines of four beats. Notes: so = G, mi = E, la = A (above middle C). Start on G.

Line	Words	Rhythm	Notes
1	Bread and ap-ples, come and buy,	ti-ti, ti-ti, ti-ti, ta	G G E E G G E
2	Car-rots, cheese and cher-ry pie,	ti-ti, ti-ti, ti-ti, ta	A A G G E E G
3	Cross the bridge and climb up high,	ti-ti, ti-ti, ti-ti, ta	G G E E G G A
4	Mar-ket day, Lit-tle Hill.	ti-ti, ta, ti-ti, ta	G G E G G E

Each syllable gets one note (a ti or a ta). Line 3 climbs up to la on "high", like climbing the hill.

Steps

✎ Opening (5 min)

Play G on the tuned instrument and sing the whole song to the class while keeping a gentle beat on your knee. "This is a song about the market in Little Hill. What can you buy there?" (Bread, apples, carrots, cheese, cherry pie.)

✎ Main activity (25 min)

1. **Learn the song (8 min).** Echo it line by line: the teacher sings a line, the class sings it back. Then two lines at a time, then the whole song. Children who do not sing can say the words, hum, or pat the beat.
2. **Read the rhythm (5 min).** Point to the rhythm cards under line 1. "Clap line 1 while you think the words." Notice that lines 1, 2 and 3 have the same rhythm and line 4 is different. "Which card is line 4?" (ti-ti, ta, ti-ti, ta.)
3. **Ostinato A (5 min).** Show card A. Everyone says and claps "Ap-ples, ap-ples, bread, bread" over and over, without stopping, while the teacher sings the song over the top. "A pattern that keeps going under a song is called an **ostinato**. It comes from an Italian word that means stubborn: it won't stop!"
4. **Two groups (7 min).** Half the class sings the song; the other half plays ostinato A on the untuned percussion (or claps it). Count the ostinato group in ("one, two, ready, go") and let them play one pattern alone before the singers start. Then swap groups. If there is time, try ostinato B the same way: "Buy, buy, buy," then a silent beat with hands apart.

✓ Discussion questions (5 min, with answers)

1. "What made it hard to keep the ostinato going?" (Hearing the song made us want to sing along or change our pattern. Any honest answer.)
2. "How did the song sound different with the ostinato?" (Bigger, fuller, busier, more like a band. Any description.)
3. "Which ostinato has a rest in it?" (B: "Buy, buy, buy, sh".)

✓ Closing check (5 min, with answers)

Children close their eyes. "I will play two things on the drum. One of them is an ostinato: a pattern that keeps repeating. Hold up one finger or two fingers against your chest to show which was the ostinato."

- First: play ostinato A's rhythm 4 times without stopping.
- Second: play 4 different patterns, one after another (for example ta, ta, ti-ti, ta; then ti-ti, ta, ta, ta; then ta, sh, ti-ti, ti-ti; then ti-ti, ti-ti, ti-ti, ta).

(The first one: one finger.) Then, eyes open: "Tell your partner what an ostinato is." (A pattern that keeps going, or repeats, under the music.)

Vocabulary

ostinato, repeat, pattern, line, starting note

Differentiation

- **Support:** the ostinato group has an adult or a confident partner in the middle; children can play only the "bread, bread" part (ta, ta) of ostinato A, which is still a repeating pattern.

- **Extension:** a small group plays ostinato A while another plays ostinato B, both under the song at once.
- Children who do not sing join the ostinato group both times.

⚠ Safety

- Sealed shakers only; beaters pointed down; instruments stay on the floor or the table until the count-in.
- Keep the ostinato quieter than the singers; use the stop signal if the room gets loud.

Teacher notes and misconceptions

- The ostinato group often speeds up or joins the song. Practise the ostinato alone first, and keep a quiet drum beat going if needed.
- Some children think an ostinato must be played on an instrument. It can be clapped, spoken, sung or played.
- The song is in so, mi and la only. Lesson 4 looks at la, the new note.
- If G feels too high or low for your class, start on another note and keep the same pattern of steps.

Lesson 4: So, mi and la

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 40 minutes.

Goal

Children hear, show and sing three notes: so and mi from grade 1, and la, one step above so. They tell which of two notes is higher, find la in "Little Hill Market", and make and play their own four-beat tune card.

Materials

- The tuned instrument (G = so, E = mi, A = la) and the song chart.
- A large three-line "ladder" card (top line la, middle line so, bottom line mi) with a movable counter.
- Per group of about 4: three chime bars (G, E and A), or a xylophone or glockenspiel with only those bars left on, and beaters.
- Per child: a tune card with four ladders side by side, and 4 counters or a pencil.
- A raised-line tune card and counters with a bump on top, for children who need them.
- A screen or large book to hide the instrument (closing check).
- For the extension: card E from lesson 2.
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

Sing the grade 1 "Hel-lo" call on so-mi (higher, then lower) and show it with hands: hands at the head for so, at the shoulders for mi. The class echoes. Now sing "Hel-lo there" on so, so, la, and show la with hands just above the head. The class echoes. "This is a new note. It is one step **higher** than so. We call it la."

✎ Main activity (25 min)

1. **Echo with hands (8 min).** Sing short patterns on "loo" and show hand heights; the class echoes with voices and hands. Use: so-mi, so-la-so, mi-so-la, la-so-mi, so-so-la-la, mi-mi-so-so. Move the counter on the ladder card as you sing. Then sing a pattern without hands and let the class show the heights.
2. **Find la in the song (5 min).** Sing "Little Hill Market" together. "Put your hands up high when we sing la." (The start of line 2, "Car-rots", and the last word of line 3, "high".)
3. **Make a tune (12 min).** Each child places one counter on each of the four ladders (on la, so or mi) to make a four-beat tune, then draws a dot on each line they chose. In groups, children take turns to play their tune on the chime bars (shortest bar = A, la;

middle = G, so; longest = E, mi), then the group sings it back on "loo". The composer can change any note they don't like. Keep the tune cards for lesson 5.

✓ Discussion questions (5 min, with answers)

1. "Which is the highest of our three notes?" (La.)
2. "On the chime bars, which bar played la?" (The shortest one. Shorter bars play higher notes.)
3. "Did anyone change their tune after hearing it? Why?" (Any reason: it sounded better, it was too jumpy, it ended in a nicer place.)

✓ Closing check (5 min, with answers)

Hide the instrument behind the screen. Children close their eyes. "I will play two notes. If the second note is higher, hold a thumb up against your chest. If it is lower, thumb down."

- Play G then A. (Up: la is higher than so.)
- Play A then E. (Down: mi is lower than la.)
- Play E then G. (Up: so is higher than mi.)

Vocabulary

so, mi, la, higher, lower, tune (melody), step

Differentiation

- **Support:** start with a two-ladder tune (so and mi only, as in grade 1); show the answer with hand height instead of words; a partner holds the chime bars.
- **Extension:** make an eight-beat tune (two cards); make a tune that fits under the rhythm of card E from lesson 2 (ti-ti beats get two dots).
- Children who cannot hear pitch differences can still compose a tune card and play it: the card and the bar lengths show high and low. See the unit's Access notes.

⚠ Safety

- Beaters pointed down; play the bars gently with a loose wrist.
- Group instruments on the table or floor, not held near faces.

Teacher notes and misconceptions

- Children often mix up "high" with "loud" and "low" with "quiet". Play a loud mi and a quiet la and ask which is higher.
- On chime bars and xylophones, shorter bars sound higher. Hand heights for so, mi and la are this unit's own aid, not a fixed system.
- The ladder is not a real five-line staff. It is a step towards one; there is no need to name lines or spaces yet.

- The pitches G, E and A are a suggestion. Any so, mi and la (for example C, A and D) work if they suit the class's voices.

Lesson 5: Music for a purpose

Unit overview - Previous: Lesson 4

About 40 minutes.

Goal

In groups, children turn "Little Hill Market" into either a lullaby for Paper Bear or a march for a Little Hill parade. They choose a tempo (speed) and dynamics (loudness) to fit the purpose, add an ostinato and one of their own tunes, rehearse against a class checklist, perform with good audience manners, and explain one choice.

Materials

- The song chart, ostinato cards A and B, the untuned percussion, the tuned instruments (chime bars G, E, A) and the hand drum.
- Per group of about 5: a choice card with a picture of Paper Bear in bed (lullaby) and a picture of a Little Hill parade (march), and boxes to tick: slow or fast; quiet or loud; ostinato A or B; which instruments.
- The groups' tune cards from lesson 4.
- A large performance checklist: (1) a steady beat; (2) we start and stop together; (3) our choices fit the purpose.
- A sentence card: "We played it ___ and ___ because ___."
- The stop signal; ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

Sing line 1 of the song twice: once slow and quiet, once fast and loud. "Which one would help Paper Bear fall asleep? Which one would you march to?" Introduce the words: **tempo** is how fast or slow the music goes, and **dynamics** is how loud or quiet it is. "Musicians choose them to fit what the music is for."

✎ Main activity (25 min)

1. **Plan (5 min).** Each group chooses lullaby or march and ticks the boxes on its choice card: tempo, dynamics, ostinato A or B, and instruments. They also choose one group member's tune card from lesson 4 to play on the chime bars as an introduction. One child can be the conductor who starts and stops the group.
2. **Rehearse (10 min).** Groups practise in this order: the tune card as an introduction, then the song with the ostinato underneath, then a clear ending together. Read the checklist aloud halfway through: "Check your beat. Do you start and stop together? Does it sound like a lullaby or a march?" Groups may change any choice.
3. **Perform (10 min).** Each group performs for the class (about 1 to 2 minutes each). Before the first group, agree audience manners: sit still, eyes on the performers, listen

to the end, clap at the end. Performers wait for quiet, start on the conductor's signal and take a bow together. After each performance, the audience guesses lullaby or march, and the group says one choice with the sentence card ("We played it slow and quiet because Paper Bear is going to sleep").

✓ Discussion questions (5 min, with answers)

1. "Did the lullabies and marches sound different, even though it was the same song?" (Yes: the tempo and dynamics were different. Any example.)
2. "Pick one point on our checklist. Which group did it well? How could you tell?" (Any group, with a reason: they all stopped at the same time; the beat stayed steady. Praise only; no group is criticised.)
3. "If you did it again, what would your group change?" (Any idea: a different ostinato, quieter shakers, a slower start.)

✓ Closing check (5 min, with answers)

Children close their eyes. "I will sing line 1. Hold your answer against your chest: one finger for a lullaby, two fingers for a march."

- Sing line 1 fast and loud (strong, not shouting). (March: two fingers.)
- Sing line 1 slow and quiet. (Lullaby: one finger.)

Then the one-to-one checks happen during this week (see Assessment in the unit overview).

Vocabulary

tempo, fast, slow, dynamics, loud, quiet, lullaby, march, purpose, conductor, audience, rehearse, perform

Differentiation

- **Support:** the group keeps one choice from the teacher (for example ostinato A) and decides only tempo and dynamics; an adult conducts.
- **Extension:** add a change partway through (for example start quiet and get louder as the parade comes nearer), or play ostinatos A and B at the same time.
- A child who does not want to perform in front of the class can be the conductor, play with the group facing away from the audience, or perform for the teacher only.

⚠ Safety

- "Loud" means strong and full, never as loud as possible. Use the stop signal if any group gets too loud.
- Sealed shakers only; beaters pointed down; mouth-blown instruments not used.
- Ear defenders and the quiet spot are always allowed, including for the audience.

Teacher notes and misconceptions

- Children often link fast with loud and slow with quiet. That is fine for a march and a lullaby, but in discussion ask whether music could be fast and quiet (a tiptoeing mouse) or slow and loud (a giant walking).
- Groups often speed up while rehearsing. Remind the conductor to keep the beat steady, perhaps with a quiet drum.
- Performances do not need to be perfect. The checklist is the criteria, and the reason a child gives matters more than how polished it sounds.
- Paper Bear and the Little Hill parade are made-up characters and places used across this curriculum.

Grade 2 Arts: A Class Dance (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 11 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check the space, the floor and footwear against your school's rules, and check access notes with families and specialist staff before lesson 1.
>
> Text-checked by three other agents (Gemini 4 Argon, Gemini 4 Carbon and Gemini 3.8 Flash); see Known gaps.

Back to the grade 2 year plan - Term 3. Builds on grade 1: Stick puppets and a story show (a story with a beginning, middle and end; performing for others) and grade 2 term 2 Beat, rhythm and tune (beats in twos and threes, "Little Hill Market"), and the arts progression

Big idea

Dancers make choices about their bodies (what shape, which body parts), about space (high, middle or low; which way they face; the pathway they travel along) and about time (fast or slow, moving or still, how long a move lasts). A dance can start from an idea, such as the weather, and those choices help an audience see the idea. A short dance has a clear beginning, a middle with the main idea, and a clear end, and dancers can remember it, repeat it, change it and perform it for others.

This is the third arts unit of the grade 2 year (term 1 was collage and texture, term 2 was music). With this unit, all four arts strands (visual art, music, drama in grade 1, and dance) have appeared by the end of grade 2. Every child dances in their own way: rolling a wheelchair, moving only the arms and head, or moving while seated all count as dancing.

Outcomes

By the end of the unit a student can:

1. Make and hold body shapes at a high, middle and low level, including one symmetrical shape (the same on both sides) and one asymmetrical shape, and match a level to its symbol.
2. Travel along a straight, curved or zigzag pathway with a chosen locomotor movement (for example walking, tiptoeing, wheeling, sliding), keep their own space, and tell turning (spinning on the spot) from circling (travelling round a circle).
3. Change the speed of a movement (fast or slow), freeze on a signal, move on the strong beat in twos or threes, and copy a partner's slow movement as a mirror without touching.
4. With a group, make a short dance about one kind of weather with a beginning shape, a middle of at least three movements and an ending freeze, record it on a dance map using symbols, and give one reason for a movement choice.
5. Perform the group dance for an audience, watch other dances quietly, and say what weather a dance showed and which movement told them.

Prior knowledge

- From kindergarten arts: moving freely and stopping on a signal; high, middle and low; moving like characters.
- From grade 1 arts: a story with a beginning, middle and end; performing a puppet show for others; "yes, and".
- From grade 2 term 2 arts: beats in twos and threes; the song "Little Hill Market".
- From grade 2 term 3 history, geography and society: weather words for the three made-up places (rain in Little Hill, cold and snow on Snowy Peak, wind at Big Harbour). This helps but is not needed.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week, in a hall or a cleared classroom. Each lesson starts with a short warm-up inside the Opening and ends calmly. Keep the level, pathway and movement-word cards up on the wall for the whole unit.

Lesson	Title	Main activity
1	Shapes and levels	Make and freeze shapes at high, middle and low levels, find symmetrical and asymmetrical shapes, match levels to symbols
2	Pathways through space	Travel on straight, curved and zigzag pathways with different movements, keep your own space, try turning and circling
3	Fast, slow, still and mirrors	Change speed, freeze on a signal, step on the strong beat, mirror a partner, repeat and change a movement
4	Making a weather dance	Groups choose a weather card and build a dance with a beginning, middle and end, then draw it on a dance map and change one thing after feedback
5	Performing and watching	Rehearse, perform for another class with performers and audience in different areas, watch and say what each dance showed

Materials (whole class unless noted)

- Every lesson: a hand drum and soft beater; a "stop" signal (a raised hand, or a picture card held up); a tambourine (a sound for blind or low-vision children to travel towards); a clear space with a non-slip floor, checked for spills and objects before the lesson; ear defenders and a quiet spot at the edge of the space.
- Level cards (lessons 1-5): three large cards, high (an arrow pointing up), middle (a flat line across the middle) and low (an arrow pointing down), plus tactile copies (a raised arrow or line made with string or felt glued on card).
- Lesson 1: a "shape" picture sheet for the teacher (in the lesson); per child, a small worksheet with three stick figures (one high, one middle, one low) and a pencil.
- Lesson 2: three large pathway cards (a straight line, a curved line, a zigzag line) and tactile copies (string glued on card); 4 soft cones or floor markers to show the edge of the space; masking tape or a rope to make one straight, one curved and one zigzag path on the floor (taped flat so nobody trips); movement-word cards: walk, tiptoe, wheel, slide, march, glide, stretch, bend, twist, sway, turn, circle.
- Lesson 3: a tuned instrument with G, E and A and the song chart of "Little Hill Market" from term 2 (optional); speed cards "fast" (a hare) and "slow" (a snail) with tactile copies (a smooth card and a bumpy card); a "still" card (a statue).

- Lesson 4: four weather cards, each with a picture and two or three words (wind: blowing, gusty, swirling; rain: dripping, splashing, puddles; snow: falling, soft, settling; sun: warm, growing, stretching), with a tactile object for each (a paper fan, a sealed bottle of water to shake, a cotton wool ball, a warm-coloured felt circle); per group of about 4, a dance map card (three boxes in a row labelled "beginning", "middle", "end", with space to draw), a set of small level, pathway and speed symbol stickers or cut-out symbols (copies of the large cards) and a pencil; a large example dance map drawn by the teacher (in the lesson).
- Lesson 5: the groups' dance maps; masking tape to mark the performing area and the audience area; per child who wants one, a lightweight scarf (a hand prop, optional); a large "good audience" card (watch, stay still, clap at the end); a large "what did you see?" card ("I think it was ___ because ___"); a class performance checklist on chart paper (clear beginning shape; at least three movements in the middle; still ending freeze; we kept our space); the level, pathway and speed cards and the still card; the four weather cards from lesson 4 (with their tactile objects).
- One-to-one check (week of lesson 5): the level cards and their tactile copies; the pathway cards and their tactile copies; the child's group dance map.

⚠ Safety and access

Safety (read before lesson 1)

- Space and floor: clear tables and chairs to the edges; check the floor for water, paper and small objects before every lesson; tape floor paths flat. Leave a wide, clear route for wheelchairs and walking frames.
- Footwear: follow the school's rule for dance and PE. Bare feet or non-slip shoes are safer than socks alone on a smooth floor.
- Personal space: everyone keeps a "space bubble" (arms out, not touching anyone). Travelling all goes the same way round the room unless the lesson says otherwise. Stop on the signal, every time.
- No lifts, no carrying, no leaning on or taking another dancer's weight, and no pulling. Mirroring and group work are done without touching.
- Turning: at most three turns at a time, then stop and look at one still spot; anyone who feels dizzy sits down. Turning is always optional.
- Low level: no rolls, no knee spins and no jumping down from furniture. Low shapes are sitting, kneeling, crouching or lying still, as each child chooses.
- Scarves (lesson 5): held in the hand only, never round the neck or tied on; put down on the floor at the side before travelling fast.
- Sound: keep the drum comfortable; ear defenders and the quiet spot are always allowed.

Access and taking part

- **Own way counts:** every movement can be done big or small, standing, seated or lying, with the whole body or with one part (hands, arms, head, eyes, fingers). A child who shows "high" by reaching one hand up has shown high.
- **Wheelchair users and children who use walking frames:** wheeling, turning the chair and rolling forward and back are locomotor movements; high is reaching up, low is leaning forward or bringing arms down; pathways can be drawn by the chair or by an arm in the air. Make floor paths wide enough. Check with the child (and their physiotherapist if they have one) which movements are comfortable.

- **Seated dancing:** any child may dance seated on a chair for part or all of a lesson, without having to explain why.
- **Blind and low-vision children:** tactile level, pathway and speed cards; describe shapes in words ("both arms up like a Y"); a partner calls the pathway ("straight, straight, now curve left"); a sound to travel towards (a gently shaken tambourine); a guide's arm only if the child asks for it. Keep the room layout the same each lesson.
- **Deaf and hard-of-hearing children:** the drum held up so the beat can be seen; a hand on the floor or the drum to feel the beat; the stop signal is always visual as well as a sound; face the child when explaining. Check with the child's specialist teacher what helps.
- **Children who do not speak:** answer by pointing to cards, signing, using their communication device or showing a movement.
- **Sound-sensitive or movement-anxious children:** ear defenders, the quiet spot, the choice to be the "drummer" or "stop-signal holder" for part of a lesson, and dancing at the edge of the room. Watching and then joining in later is fine.
- **Performing:** no child performs alone unless they want to. In lesson 5 every child performs as part of a group, and a child may choose to be the group's drummer, to perform for the teacher only, or to show the dance map instead of dancing.
- Never comment on bodies, weight or what bodies look like. Comments are about choices: level, pathway, speed, stillness, the idea.

Assessment

- Lessons 1-4: the teacher notes answers in the closing checks (observe; no writing needed). Children answer by moving, pointing to a card, signing or speaking. Closing checks use eyes closed or answers held against the chest, so that children cannot copy a neighbour.
- Lesson 4: look at each group's dance map (beginning, middle with at least three movements, end) and note one reason from each child.
- Lesson 5: watch each group's performance against the class checklist (clear beginning shape; at least three movements in the middle; still ending freeze; we kept our space), and note what each child said or pointed to about another group's dance.
- Nobody is assessed on how high they jump, how fast they move, flexibility or how a movement looks; only on the choices the unit teaches.
- **One-to-one check (about 3 minutes per child, during the week of lesson 5):**
    1. "Show me a shape at a low level. Now a high level." (Any low shape, then any high shape, in the child's own way; a hand reaching down then up counts.)
    2. Lay out the three level cards. "Which card means middle?" (The flat line across the middle.)
    3. Lay out the three pathway cards. "Show me this pathway with your finger, a walk or your chair." Point to the zigzag card. (Any travel or tracing that changes direction sharply, like a Z.)
    4. "What is the difference between turning and circling?" (Turning: spinning on the spot. Circling: travelling round in a circle. A child may show both instead of saying them.)
    5. "Be my mirror." The teacher slowly raises one hand, then the other, then tilts their head. (The child copies at about the same time, on the matching side as a mirror would, without touching. A child who copies but uses the other hand is "with help".)
    6. Show the child's group dance map. "Show me or tell me how your dance began and ended. Why did you choose one of the movements?" (A beginning shape and an

ending freeze, plus any reason linked to the weather, for example "we went low and slow because snow settles".)
- Record each item as "yes / with help / not yet". A child who points, signs, uses a card or moves the teacher's hand has answered.

Sources

National Core Arts Standards, "Dance at a Glance", grade 2 column, read from the PDF on 11 November 2026: https://www.nationalartsstandards.org/sites/default/files/2021-11/Dance%20at%20a%20Glance.pdf

The unit uses these grade 2 performance standards as a guide (quoted exactly; the unit is not a full alignment). The PDF prints the responding codes with an extra dot (for example "DA:Re.7.1.2"); they are written here in the same form as the others.

- DA:Cr1.1.2a "Explore movement inspired by a variety of stimuli (for example, music/sound, text, objects, images, symbols, observed dance, experiences) and suggest additional sources for movement ideas." Lesson 4 (weather cards and objects), lesson 3 (music).
- DA:Cr1.1.2b "Combine a variety of movements while manipulating the elements of dance." Lessons 3-4.
- DA:Cr2.1.2a "Improvise a dance phrase with a beginning, a middle that has a main idea, and a clear end." Lesson 4.
- DA:Cr2.1.2b "Choose movements that express a main idea or emotion, or follow a musical phrase. Explain reasons for movement choices." Lesson 4.
- DA:Cr3.1.2a "Explore suggestions and make choices to change movement from guided improvisation and/or short remembered sequences." Lessons 3-4 (repeat and change; change one thing after feedback).
- DA:Cr3.1.2b "Depict the levels of movements in a variety of dance movements by drawing a picture or using symbols (for example, high, middle, low)." Lessons 1 and 4.
- DA:Pr4.1.2a "Demonstrate clear directionality and intent when performing locomotor and non- locomotor movements that change body shapes, facings, and pathways in space. Identify symmetrical and asymmetrical body shapes and examine relationships between body parts. Differentiate between circling and turning as two separate ways of continuous directional change." Lessons 1-2.
- DA:Pr4.1.2b "Identify the length of time a move or phrase takes (for example, whether it is long or short). Identify and move on the downbeat in duple and triple meter. Correlate metric phrasing with movement phrasing." Lesson 3, partly (see Known gaps).
- DA:Pr5.1.2b "Move safely in a variety of spatial relationships and formations with other dancers, sharing and maintaining personal space." Lessons 2-5.
- DA:Pr5.1.2c "Repeat movements, with an awareness of self and others in space. Self- adjust and modify movements or placement upon request." Lessons 3 and 5.
- DA:Pr6.1.2a "Dance for and with others in a space where audience and performers occupy different areas." Lesson 5.
- DA:Pr6.1.2b "Use limited production elements (for example, hand props, simple scenery, or media projections)." Lesson 5 (optional scarves).
- DA:Re7.1.2a "Find movements in a dance that develop a pattern." Lesson 5.
- DA:Re8.1.2a "Use context cues from movement to identify meaning and intent in a dance using simple dance terminology." Lesson 5.

The weather idea, the weather cards, the dance map, the movement-word cards, the level, pathway and speed symbols and all checks are the author's own examples, not from a source. "Little Hill Market" is the original song from the term 2 arts unit (CC0).

Known gaps and cautions

- Three other agents (Gemini 4 Argon, Gemini 4 Carbon and Gemini 3.8 Flash, all at fe16590) text-checked this unit on 2026-11-11. Argon and Gemini 3.8 Flash reported no errors; Carbon reported two lesson 5 errors (weather and still cards missing from the materials; wrong visitor timing), fixed in 70bf99e (Carbon re-checked that diff the same day). Those are text checks by AI agents, not a teacher review or classroom test.
- DA:Re7.1.2b ("Demonstrate and describe movements in dances from different genres or cultures") and DA:Re9.1.2a ("Observe or demonstrate dances from a genre or culture...") are not covered: the unit supplies no recordings or dances from named traditions. A teacher could add a licensed recording or a visit from a local dancer, chosen with care and credited (see the arts progression's note on living traditions).
- DA:Pr4.1.2b is only partly met: lesson 3 does long and short moves and stepping on the strong beat in twos and threes, but not matching dance phrases to musical phrases in detail.
- Other grade 2 dance standards in the PDF were not used, including DA:Pr5.1.2a and the connecting standards (DA:Cn10.1.2 and DA:Cn11.1.2).
- The year plan names "movement words (fast/slow, high/low, still/moving)"; the unit adds shapes, pathways, symmetry and mirroring from the NCAS grade 2 column and the arts progression's grade 2 line ("mirror a partner; repeat and vary a movement").
- Timings are untested. Lesson 4 (choosing, making, drawing and changing a dance in one lesson) is the most likely to run over; drawing the dance map can move to the start of lesson 5.
- A trained dance teacher will know more about warm-ups, safe floor work and how much turning suits seven-year-olds; adjust the safety notes to your setting.
- Weather is a shared, made-up idea here. If a class has recently lived through a frightening storm or flood, choose a different idea (for example a seed growing, or a day at Little Hill market).

Lesson 1: Shapes and levels

Unit overview - Next: Lesson 2

Back to the grade 2 year plan

About 40 minutes.

Goal

Children make and hold body shapes at a high, middle and low level, find symmetrical shapes (the same on both sides) and asymmetrical shapes, freeze on a signal, and match a level to its symbol.

Materials

- A hand drum and soft beater; the stop signal; a tambourine (a sound to travel towards); ear defenders and the quiet spot; a clear space with the floor checked.
- The three large level cards (high: an arrow pointing up; middle: a flat line across the middle; low: an arrow pointing down) and their tactile copies.
- The teacher's shape picture sheet (below).
- Per child: a small worksheet with three stick figures (one reaching high, one at middle height, one low), and a pencil.

Teacher's shape picture sheet (an example, not from a source):

- Symmetrical: a star (arms and legs wide), a tall thin pencil, a ball (curled small), a bridge made with both hands on knees.
- Asymmetrical: a teapot (one hand on hip, one arm out), a tree leaning in the wind (both arms to one side), one arm up and one arm down.
- Seated versions: star = arms wide; pencil = arms straight up; ball = arms hugged in; teapot = one hand on the hip, one arm out to the side.

Steps

✎ Opening (5 min)

1. Talk through the space rules: our space bubble (arms out, not touching anyone), the stop signal, and "own way counts" (big or small, standing or seated, whole body or one part).
2. Warm-up: the teacher plays a slow steady beat. Everyone gently wakes up one body part at a time on the spot: nod the head, roll the shoulders, wiggle the fingers, reach the arms up and down, wiggle the toes or shuffle the feet. Then three slow breaths in and out.

✎ Main activity (25 min)

1. **Freeze shapes (6 min).** The teacher drums and everyone moves on the spot in any way. When the drum stops (and the stop signal goes up), everyone freezes in a shape and holds it for three slow counts. Do it five or six times. Call out a word before some freezes: "a big shape", "a small shape", "a curved shape", "a pointy shape".
2. **Levels (8 min).** Show the three level cards. High is reaching up (on tiptoe, arms up, or one hand reaching up). Middle is about the height of a table. Low is near the floor (sitting, kneeling, crouching, lying still, or leaning forward in a chair with arms down). Hold up one card at a time; children make a shape at that level and hold it. Then play "level change": three slow drum beats to change from high to low, three to change from low to middle, and so on. Move slowly and safely when going down and up.
3. **Same on both sides (6 min).** Show a star shape: "If I drew a line down the middle of me, would both sides match?" (Yes.) That is a symmetrical shape. Show a teapot shape: "Do both sides match?" (No.) That is an asymmetrical shape. Children try two shapes from the picture sheet of each kind, then invent one of each. Partners take turns to show a shape; the other says "same on both sides" or "different on both sides". Partners never touch.
4. **Draw the levels (5 min).** Children sit down. On their worksheet they draw one of their own shapes next to each stick figure (or draw a tick under the figure that matches a shape the teacher shows). Show the level cards again; children draw the matching symbol (up arrow, flat line, down arrow) under each figure.

✓ Discussion questions (5 min)

- "What is the difference between a high shape and a low shape?" (A high shape reaches up, away from the floor; a low shape is close to the floor.)
- "Is a star shape symmetrical or asymmetrical? How do you know?" (Symmetrical: both sides match.)
- "Can you make a high shape sitting down?" (Yes: reach the arms or one hand up.)

✓ Closing check (5 min)

Children sit with eyes closed (or face the wall). The teacher says a level word: "Show me a low shape." Then: "Show me a high shape." Watch each child. Then, with eyes open, the teacher holds up the middle card and asks children to hold one, two or three fingers against their chest: "Is this card high (1), middle (2) or low (3)?" (2, middle.) Finish with three slow breaths in a still shape.

Vocabulary

shape, freeze, level, high, middle, low, symmetrical (the same on both sides), asymmetrical (different on each side), space bubble

Differentiation

- More support: show the shape and say it at the same time; use only high and low at first; give the child a picture card of a shape to copy.
- More challenge: make an asymmetrical shape at a low level; change level in exactly three beats; make a shape with a partner that matches theirs without touching.
- Children who move only part of their body show levels with their arms, hands or head and draw their own shapes.

⚠ Safety

- Check the floor before the lesson. Clear space; space bubbles.
- Go down to low level slowly; no dropping to the knees, no rolls.
- Nobody holds a shape that hurts; three slow counts is enough.

Teacher notes and misconceptions

- Some children think "low" means "small". A low shape can be wide (lying in a star); a high shape can be thin. Show both.
- "Symmetrical" is a hard word; "same on both sides" is fine. Children may say a shape is symmetrical when the arms match but the head is tilted; praise the looking and let them decide.
- Comments are about choices ("you chose a low level"), never about how a body looks.

Lesson 2: Pathways through space

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Back to the grade 2 year plan

About 40 minutes.

Goal

Children travel along straight, curved and zigzag pathways with different locomotor movements (movements that travel), use non-locomotor movements (movements on the spot), keep their own space while moving among others, and tell turning (spinning on the spot) from circling (travelling round a circle).

Materials

- A hand drum and soft beater; the stop signal; a tambourine (a sound to travel towards); ear defenders and the quiet spot; a clear space with the floor checked.
- The level cards from lesson 1.
- The three large pathway cards (a straight line, a curved line, a zigzag line) and their tactile copies.
- 4 soft cones or floor markers for the edge of the space.
- Masking tape or a rope to make one straight, one curved and one zigzag path on the floor, taped flat, and wide enough for a wheelchair.
- Movement-word cards: walk, tiptoe, wheel, slide, march, glide (these travel); stretch, bend, twist, sway, turn, circle (these are for the game in step 1 and for step 4).

Steps

✎ Opening (5 min)

1. Warm-up on the spot to a slow drum beat: stretch up, bend down, twist gently side to side, sway like a tree. "These movements stay on the spot. Dancers call them non-locomotor movements."
2. "Today our movements will travel. Movements that take us from one place to another are called locomotor movements." Show the walk, tiptoe, wheel, slide, march and glide cards.

✎ Main activity (25 min)

1. **Travel and freeze (5 min).** Everyone travels the same way round the room, inside the cones, using the movement on the card the teacher holds up (walk, tiptoe, march, glide; wheelchair users wheel or glide). On the stop signal, freeze in a shape. Before moving again, check your space bubble. Swap the card every few freezes. Once or twice, call "on the spot!" and hold up stretch, sway or twist instead: everyone stays where they are.

2. **Pathways on the floor (8 min).** Show the three pathway cards. In three groups, children follow the taped paths one at a time, leaving two big steps (or one chair length) between dancers: the straight path with a march, the curved path with a glide, the zigzag path with a walk that turns sharply at each corner. Groups move on to the next path when the drum gives three beats. A partner can call the path for a child who is blind ("straight, now curve"), or the child can travel towards the tambourine.
3. **Pathways in the air (4 min).** Without the tape, children draw each pathway in the air with a hand or an elbow, then travel it across the space in their own way. The teacher holds up a card; children show it.
4. **Turning and circling (5 min).** Show the turn card: "A turn spins you round on the spot. You end up in the same place." Everyone does one slow turn (standing, seated turning the chair, or turning the head and shoulders), then looks at one still spot. Show the circle card: "A circle is a pathway. You travel round a big circle and come back to where you started." Half the class walks or wheels a big circle round a cone while the other half watches, then swap. At most three turns at a time; anyone dizzy sits down.
5. **Facing (3 min).** Children walk four steps forward, then four steps with their front facing a different wall, then four steps backwards (only if the space behind is clear, and slowly). "Which way is your front facing?" Wheelchair users turn the chair to face each wall.

✓ Discussion questions (5 min)

- "What is the difference between a locomotor and a non-locomotor movement?" (Locomotor movements travel from place to place, like walking; non-locomotor movements stay on the spot, like stretching.)
- "What is the difference between turning and circling?" (Turning: spinning on the spot. Circling: travelling round a circle and back.)
- "How did you keep your space bubble on the pathways?" (Waiting for a gap; leaving two steps between dancers; slowing down; stopping on the signal.)

✓ Closing check (5 min)

Children sit with eyes closed, or with a hand over their eyes. The teacher describes a movement: "I travel round a big ring and come back. Am I turning or circling?" Children show one finger for turning and two fingers for circling, held against their chest. (Two: circling.) Then: "I spin round on the spot." (One: turning.) Then, eyes open, each child traces one pathway card the teacher points to in the air with a finger. Finish sitting still for three slow breaths.

Vocabulary

locomotor (travelling), non-locomotor (on the spot), pathway, straight, curved, zigzag, turn, circle, facing, space bubble

Differentiation

- More support: travel only along the taped paths; follow a partner (without touching) along a pathway; use only walk and tiptoe.
- More challenge: travel a zigzag pathway at a low level; change the locomotor movement at each corner; draw a pathway on a card for a partner to follow.
- Children with limited movement can trace pathways with a hand, an eye pointer or a finger on the tactile card.

⚠ Safety

- Taped paths must lie flat. Everyone travels the same way round the room in step 1.
- Backwards travel is slow, only four steps, and only with clear space behind; it is optional.
- Turning: at most three turns at a time, then stop and look at one still spot. Turning is optional.

Teacher notes and misconceptions

- Children often mix up "turn" and "circle" because both go round. The test is: did you travel? If you end up where you started after travelling, that was a circle; if you never left the spot, that was a turn.
- A pathway is the shape your travelling leaves on the floor, like a snail trail. Some children find it easier to draw it first and dance it second.
- Galloping and skipping are fine extras if your class can do them safely; they are left out here because not every child can do them yet.

Lesson 3: Fast, slow, still and mirrors

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Back to the grade 2 year plan

About 40 minutes.

Goal

Children change the speed of a movement, freeze and hold stillness, tell a long move from a short move, step or tap on the strong beat in twos and in threes, copy a partner's slow movement as a mirror without touching, and repeat a short movement and then change one thing about it.

Materials

- A hand drum and soft beater; the stop signal; a tambourine; ear defenders and the quiet spot; a clear space with the floor checked.
- The level cards and pathway cards from lessons 1 and 2.
- Speed cards: "fast" (a hare) and "slow" (a snail), with tactile copies (a smooth card for fast and a bumpy card for slow), and a "still" card (a statue).
- Optional: the song chart of "Little Hill Market" from the term 2 arts unit and a tuned instrument with G, E and A.

Steps

✎ Opening (5 min)

1. Warm-up: travel round the room the same way to the drum. Fast beats: small quick steps (or quick taps on the chair's armrests). Slow beats: big slow steps or a slow glide. The drum stops: freeze.
2. Show the fast, slow and still cards. "Stillness is part of dancing too. A still dancer is still dancing."

✎ Main activity (25 min)

1. **Speed changes (6 min).** On the spot, children make one movement, such as reaching an arm up and bringing it down. The teacher holds up the slow card: do it as slowly as a snail. The fast card: quick and small. The still card: freeze. Try it with a sway, a twist and a stretch. Then travel: slow on a straight pathway, fast (but safe and small) on a curved pathway, freeze on the signal.
2. **Long and short (4 min).** The teacher drums one beat: children make a short, sharp move (a quick point or a pop up). The teacher drums eight slow beats: children make one long move that lasts all eight (one slow rise from low to high). "Was that move long or short?"
3. **Strong beats in twos and threes (6 min).** Remind children of term 2: some music goes "ONE two, ONE two" and some "ONE two three, ONE two three". Drum twos: everyone steps, pats or nods on the strong beat (ONE) and stays still on the weak beat.

Drum threes: a big sway on ONE and small taps on two and three. The teacher can sing "Little Hill Market" (it goes in twos) while children step on the strong beats.

4. **Mirrors (6 min).** Partners face each other, an arm's length apart, never touching. One is the leader and moves very slowly (arms, head, shoulders, fingers, level changes); the other is the mirror and copies at the same time, like a reflection. "If your leader moves their right hand, you move the hand on the same side as it would be in a mirror." Keep it slow so the mirror can keep up. Swap after about a minute; do two rounds each. Seated partners mirror seated.
5. **Repeat and change (3 min).** Partners make a short pattern of three moves (for example: stretch up, twist, freeze low). Do it twice exactly the same. Then change ONE thing: the speed, the level or the pathway. Show the change to another pair, who guess what changed.

✓ Discussion questions (5 min)

- "What made a good mirror?" (Moving slowly; watching the leader's face and whole body; keeping the same timing; not touching.)
- "When you repeated your pattern and then changed one thing, what did you change?" (Any of speed, level, pathway or size.)
- "Was it harder to move fast or slow? Why?" (Any answer with a reason; many children find very slow movement harder to control.)

✓ Closing check (5 min)

Children sit with eyes closed. The teacher drums one beat, then eight slow beats, then one beat. "Hold up one finger against your chest if the last sound was long, two fingers if it was short." (Two: short.) Then, eyes open, the teacher is the leader and moves slowly while every child mirrors; watch each child's timing and side. Finish in a still shape for three slow breaths.

Vocabulary

speed, fast, slow, still, freeze, long, short, strong beat, mirror, leader, repeat, change

Differentiation

- More support: mirror only one body part (hands); the teacher leads; use only fast and slow (leave long and short for another day).
- More challenge: change two things at once (speed and level); lead a mirror that changes level; step on the strong beat while travelling a pathway.
- A child who cannot see the leader can mirror by sound: the leader describes each move ("right hand up slowly"); or the child leads.

⚠ Safety

- Fast travel stays small and safe; everyone travels the same way round the room; fast is never a race.
- Mirrors never touch and stay an arm's length apart.

- Stop on the signal every time.

Teacher notes and misconceptions

- Many children think mirroring means using the same hand as the leader (their right for the leader's right). A real mirror swaps sides; show this slowly, but do not mark children down for it in this lesson.
- Slow and quiet are different. A slow movement can be strong and a fast movement can be gentle.
- If children rush on the strong beat, let them only nod on ONE at first.

Lesson 4: Making a weather dance

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Back to the grade 2 year plan

About 40 minutes.

Goal

In groups of about 4, children choose a kind of weather and make a short dance about it, with a beginning shape, a middle of at least three movements that show the weather, and an ending freeze. They record the dance on a dance map with symbols, give a reason for a movement choice, show it to another group, and change one thing after feedback.

Materials

- A hand drum and soft beater; the stop signal; a tambourine; ear defenders and the quiet spot; a clear space with the floor checked.
- The level, pathway and speed cards (and the still card) on the wall.
- Four weather cards, each with a picture and words: wind (blowing, gusty, swirling); rain (dripping, splashing, puddles); snow (falling, soft, settling); sun (warm, growing, stretching). With each card, a tactile object: a paper fan (wind), a sealed bottle of water to shake (rain), a cotton wool ball (snow), a warm-coloured felt circle (sun).
- Per group of about 4: a dance map card (three boxes in a row labelled "beginning", "middle", "end", with space to draw), a set of small level, pathway and speed symbols (stickers or cut-out copies of the large cards), and a pencil.
- The teacher's large example dance map (below), drawn on chart paper.

Teacher's example dance map: "Snow" (an example, not from a source):

- Beginning: a high, still shape, arms up and fingers spread (symbols: high, still).
- Middle: (1) fingers flutter slowly down from high to low (slow, high to low); (2) glide on a curved pathway, gently (curved, slow); (3) one slow turn, sinking to a middle level (middle, slow).
- End: a low, curled, still shape, like snow settling (low, still).

Steps

✎ Opening (5 min)

1. Warm-up: a quick game of "fast, slow, still" with the cards from lesson 3, then two level changes (high to low in three beats, low to high in three beats).
2. Show the weather cards and pass round the objects. "Dancers get ideas from all kinds of things: music, pictures, objects, things that happen. Today our idea is the weather."

✎ Main activity (25 min)

1. **Explore (5 min).** The teacher reads one weather card's words, and everyone tries movements for each word: "dripping" (small sharp finger flicks), "swirling" (circling arms, or circling the room), "settling" (sinking slowly to low). Do two cards together as a class. Ask: "Is rain fast or slow? High or low? Does it travel?" Any answer with a reason is fine.
2. **Build the dance (10 min).** Groups choose a weather card (two groups may have the same weather). Each group decides: a beginning shape (everyone holds it still, all together); a middle with at least three movements that show the weather, using at least two levels and one pathway; an ending freeze. Groups practise it three times, starting and ending together. The teacher circulates and asks: "Why did you choose that movement?" Every child in the group chooses or changes at least one movement.
3. **Draw the dance map (5 min).** Show the example "Snow" map. Each group draws its dance in the three boxes: a stick figure or a word for each part, plus the level, pathway and speed symbols. One child can draw while others call out the next part, and roles can swap.
4. **Show, feedback, change (5 min).** Pairs of groups take turns to show their dance to each other. The watching group says one thing they saw ("I saw a low, slow ending") and one idea ("Could you add a fast part?"). The dancing group chooses ONE change (speed, level, pathway or movement), tries it, and adds it to the map.

✓ Discussion questions (5 min)

- "How does your dance show the weather?" (Any movement linked to the weather, for example "fast zigzag for the wind", "low and still for a puddle".)
- "What did you change after feedback, and was it better?" (Any change with a reason. "Not better, so we changed it back" is a good answer.)
- "Why does a dance need a clear ending?" (So the audience knows it has finished; so dancers end together.)

✓ Closing check (5 min)

Each group holds up its dance map. The teacher points to one symbol on each map ("Which level is this?" or "Which pathway is this?"), and the group answers. Then, one child at a time from each group, quietly to the teacher, points to or says one reason for one movement in their dance. Note which children gave a reason. Finish by sitting still for three slow breaths.

Vocabulary

idea, weather, beginning, middle, end, ending freeze, dance map, symbol, reason, feedback, change

Differentiation

- More support: use the "Snow" example and change only one part; the teacher gives three movement choices and the group picks; groups of 3.

- More challenge: add a part where the group moves in unison (all the same) and then in their own ways; repeat one movement twice to make a pattern; add a strong beat in twos or threes from lesson 3.
- Children who do not speak can choose movements by showing them or by pointing to symbols; their choices go on the map.

⚠ Safety

- Groups need space between them; agree where each group practises.
- No lifting, carrying or leaning on each other in any group shape. Group shapes are made by standing or sitting near each other, not touching.
- The water bottle stays sealed and the cotton wool is not for mouths.

Teacher notes and misconceptions

- Groups often make the middle very long. Three movements is enough; a short, clear dance is better than a long one nobody remembers.
- Some groups act the weather (pretending to hold an umbrella) rather than being it. Both are fine; ask "Can you show the rain itself?"
- If a group argues, give each child one part of the middle to choose.
- If anyone in the class has had a frightening experience of a storm or a flood, leave out wind and rain or use a different idea (see Known gaps in the unit overview).

Lesson 5: Performing and watching

Unit overview - Previous: Lesson 4

Back to the grade 2 year plan

About 40 minutes.

Goal

Groups rehearse their weather dance, perform it for another class in a space where the performers and the audience are in different areas, and watch the other dances quietly. Children say what weather a dance showed and which movement told them, and notice a movement that repeated to make a pattern.

Materials

- A hand drum and soft beater; the stop signal; a tambourine; ear defenders and the quiet spot; a clear space with the floor checked.
- The groups' dance maps from lesson 4.
- Masking tape to mark the performing area and the audience area (taped flat).
- Per child who wants one: a lightweight scarf (an optional hand prop).
- A large "good audience" card: watch; stay still; clap at the end.
- A large "what did you see?" card: "I think it was ___ because ___."
- The level, pathway and speed cards (and the still card) on the wall.
- The four weather cards from lesson 4 (wind, rain, snow, sun, with their tactile objects) on the wall.
- A class performance checklist on chart paper: (1) a clear beginning shape; (2) at least three movements in the middle; (3) a still ending freeze; (4) we kept our space.

Before the lesson

Invite another class (or a small group of them) for about 20 minutes in the middle of the lesson (from about minute 11, after the final rehearsal, until the discussion). Tape the performing area at one end of the space and the audience area at the other, with a clear gap and a wide route for wheelchairs. Agree the order of groups.

Steps

✎ Opening (5 min)

1. Warm-up: wake up each body part, three level changes, and one round of "fast, slow, still".
2. Read the class checklist together. "Today we perform for an audience. Performers dance in this area; the audience sits in that area."

✎ Main activity (25 min)

1. **Final rehearsal (6 min).** Each group rehearses its dance twice, using its map, starting and ending together. Children who want a scarf decide where in the dance to use it (for example, swirling for wind). Scarves are held in the hand only and put down at the side before any fast travel. A group can also choose a drummer from its own members.
2. **Set up and audience rules (3 min).** The visiting class arrives and sits in the audience area. Children from both classes read the "good audience" card together. The dancing class sits in the audience area too while it waits for its turn.
3. **Performances (16 min).** Each group in turn: walks or wheels to the performing area, holds its beginning shape (the teacher gives two quiet drum beats to start), dances, holds its ending freeze, and the audience claps. After each dance (about 2 minutes each, including answers), ask the audience:
    - "What weather do you think that was? Which movement told you?" (Children use the "I think it was ___ because ___" card; any weather with a linked movement counts. The dancers then say what it was.)
    - "Did any movement happen more than once and make a pattern?" (For example: "They swirled and froze, swirled and froze.")

A child who has chosen not to dance in front of the visitors can hold up the group's dance map, be the drummer, or perform for the teacher afterwards.

✓ Discussion questions (5 min)

After the visitors leave:

- "What was it like to perform? What was it like to watch?" (Any honest answer. Feeling nervous is normal; it might feel different next time.)
- "Which checklist point did your group do best?" (Any point with an example.)
- "If you danced it again, what one thing would you change?" (Any change to speed, level, pathway or movement.)

✓ Closing check (5 min)

With eyes closed, children answer by holding fingers against their chest: "In our dances, the audience and the performers were in different places. One finger if that is true, two if it is false." (One: true.) Then the teacher holds up one group's dance map and asks: "What weather was this dance?" Children point to the weather card on the wall. Finish with a cool-down: a slow stretch up, a slow sink to a low or seated shape, and three slow breaths.

Vocabulary

perform, rehearse, audience, performing area, hand prop, pattern, checklist

Differentiation

- More support: groups perform for the teacher and their own class before the visitors arrive; the teacher counts the group in and out.

- More challenge: a group explains its dance map to the audience before dancing; a child notices a pattern in another dance and copies it.
- Audience answers can be signed, pointed to on the weather cards, or given to the teacher quietly afterwards.

⚠ Safety

- The performing and audience areas are marked with flat tape and kept apart; nobody runs between them.
- Scarves are held in the hand only, never round the neck or tied on.
- Only one group dances at a time.

Teacher notes and misconceptions

- Performing is optional for each child, but everyone has a role. Never push a child to perform alone.
- Audience comments are about what they saw (levels, speed, pathways, the weather), not about who was "best".
- If you cannot invite another class, a small group of adults or the class itself split into two halves works as an audience.
- Use the week of this lesson for the one-to-one check in the unit overview.

Grade 3 Arts: Choosing Colours for a Painting (5 lessons, about 2-3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 5 November 2026; rewritten 6 November 2026 after feedback from a teacher (see "Revision note" below). No educator has formally reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules.

Back to the arts progression

Big idea

Painters choose their starting colours. Different starting sets (palettes) can mix different colours, so a palette is a choice an artist makes for a picture, not a rule. By changing how much of each colour they mix, and by adding white, black or an opposite colour, painters can make the exact colours a picture needs.

Revision note

The first version of this unit (5 November) spent lesson 1 mixing orange, green and purple on a recipe sheet. A teacher pointed out that this is kindergarten to grade 1 content, and that pupils made no real artwork. It also presented red, yellow and blue as "the" primary colours. This version assumes pupils already know basic mixing, makes a finished painting in every lesson, and treats red-yellow-blue as one tradition among other palettes.

Outcomes

By the end of the unit, students can:

- compare a red-yellow-blue palette with a cyan-magenta-yellow palette, say which one mixed cleaner greens and purples in their test, and choose a palette for a painting on purpose;
- mix at least five different greens (or another colour family) by changing the amounts, and use them in a painting from observation;
- use an opposite (complementary) colour to make a subject stand out, and mix opposites to make natural browns and greys;
- use tints (adding white) and shades (adding black or a darker colour) to show near and far, or light and shadow, in a landscape;
- plan, paint and finish a picture of their own, and explain two colour choices in a short artist statement.

Prior knowledge

- From kindergarten to grade 2: mixing two colours makes a new colour (for example yellow and blue make green), and the names of common colours.
- Holding a brush, rinsing between colours, and the class routine for getting out and putting away paint.

- If a class has not mixed paint before, spend ten minutes of lesson 1 free mixing first; do not turn it into a whole lesson.

Lessons

Every lesson ends with a finished small painting. Keep them in a folder; they are the evidence for assessment.

1. Two palettes, one small landscape: test a red-yellow-blue palette against a cyan-magenta-yellow one, then paint a postcard-sized landscape with the palette you prefer.
2. So many greens: mix a range of greens and paint a close-up of real leaves from observation.
3. Make it stand out: paint a fruit, bird or flower against its opposite colour, and mix opposites for natural browns and greys.
4. Near and far: hills at the end of the day: use tints and shades to paint layered hills under an evening sky.
5. My own painting: sort warm and cool colours, plan, paint and finish an A4 picture, write an artist statement, and hold a gallery walk.

Materials (per group of 3-4)

- Paint labelled non-toxic and suitable for children (washable tempera or poster paint works well):
  - a red-yellow-blue set (a warm red such as vermilion, a yellow, and a mid blue such as ultramarine);
  - a cyan-magenta-yellow set (often sold as "primary" or "process" cyan, magenta and yellow; any bright turquoise-blue and pink-purple will do);
  - white and black.
- Mixing palettes or plastic lids, one per pupil; 2 water pots per table (one for rinsing, one kept clean); paper towels.
- Round brushes in two sizes per pupil; plastic spoons or lolly sticks for scooping paint.
- Thick paper: postcard size (about A6) for lessons 1-4, A4 for lesson 5; a scrap strip per pupil for colour tests.
- Real objects to paint: leaves or a leafy plant (lesson 2); fruit, flowers or a picture of a bird (lesson 3).
- Aprons or old shirts; table covers; a drying rack or floor space.
- Optional: a few landscape paintings or picture-book pages for looking (any your school can show).

Assessment

- **During the unit:** each lesson produces a painting and a short test strip. Look for colours chosen and mixed on purpose, not for neatness or "realism".
- **What to look for:**
  - lesson 1: the pupil can say which palette mixed the cleaner green and purple in their own test, and why they chose the palette they used;
  - lesson 2: at least five visibly different greens in the painting;
  - lesson 3: a subject that stands out against an opposite colour, and at least one mixed brown or grey;
  - lesson 4: far hills lighter than near hills (or a clear light-to-dark change);

    - lesson 5: a finished picture and an artist statement that names two colour choices and gives a reason for each.
- **End check:** the closing check in lesson 5 (8 questions, with answers). There is no pass mark; use it to see who needs another go.

⚠ Safety (read before lesson 1)

- Use paints labelled non-toxic and suitable for children. Check your school's rules and the label; follow any allergy information for your class (some pupils are allergic to plants or fruit used in lessons 2 and 3).
- Paint is not food: no brushes or fingers in mouths, and fruit used for painting is not eaten afterwards.
- Aprons on, sleeves up; wipe spills straight away so no one slips.
- Wash hands with soap and water after painting and before eating.
- Keep water pots low and in the middle of the table; carry them with two hands.

Sources

- Wikipedia, "Primary color": https://en.wikipedia.org/wiki/Primary_color (primaries are chosen for a given use; the most common subtractive primaries are cyan, magenta and yellow; red-yellow-blue is the system of "traditional color theory", based on experience with pigments; there is no consensus on a specific set of primary pigments, and the choice depends on the artist's preference and the materials; colour-mixing guides often use a blue closer to cyan and a red closer to magenta to get a larger range; one painter-writer, MacEvoy, explains that artists often still choose palettes nearer to RYB because they want strong yellow-to-red mixtures, at the cost of duller greens and purples).
- Wikipedia, "RYB color model": https://en.wikipedia.org/wiki/RYB_color_model (RYB is a traditional model used in art and design education, often with white and black added; it emerged when pigments were limited and costly; the CMY model is much more accurate in colour range and intensity; cyan, magenta and yellow are also called "process blue", "process red" and "process yellow").
- Wikipedia, "Complementary colors": https://en.wikipedia.org/wiki/Complementary_colors (complements sit opposite each other on a colour wheel; mixing them dulls the colour towards grey or brown; side by side they make a strong contrast; which pairs count as complements depends on the colour model).
- Wikipedia, "Tint, shade and tone": https://en.wikipedia.org/wiki/Tint,_shade_and_tone (a tint is a colour mixed with white, a shade a colour mixed with black, a tone a colour mixed with grey).
- Wikipedia, "Aerial perspective": https://en.wikipedia.org/wiki/Aerial_perspective (distant objects lose contrast and detail; their colours become less saturated and shift towards the background colour, usually bluish, but reddish around sunrise or sunset).
- Wikipedia, "Color theory", section "Warm vs. cool colors": https://en.wikipedia.org/wiki/Color_theory (warm colours are often said to run from red through yellow, cool colours from blue-green through blue-violet; warm colours are said to advance and cool colours to recede).

Known gaps and cautions

- **No palette is "the" correct one.** Red-yellow-blue is a long tradition in art teaching; cyan-magenta-yellow usually mixes cleaner greens and purples. Many painters use other sets again. Let pupils' own tests decide which they prefer for a picture. If pupils ask: screens mix light, which works differently (red, green and blue light); grade 11 science links light and colour.
- **Results depend on the actual paints.** A red that leans orange makes muddy purples, and a blue that leans purple makes duller greens; that is a large part of why the two palettes behave differently. Try both sets yourself before lesson 1 and note what your paints do.
- "Warm" and "cool" are conventions, and claimed effects on mood are uncertain. Present them as "usually called", not as facts about feelings.
- Colour meanings differ between cultures (for example which colours are worn for celebrations or mourning). Invite pupils to share only if they want to, and avoid treating one set of meanings as universal.
- Some pupils have colour vision deficiency. Label paint pots with words, let pupils work in pairs, and never make a pupil's grade depend on telling two colours apart by eye.
- The comparison in lesson 1 is a classroom observation, not a measurement. Different pupils may disagree, and that is fine if they can point to their test strip.
- Sources are encyclopedia articles. No educator has formally reviewed this draft.

Lesson 1: Two palettes, one small landscape

Unit overview · Next: Lesson 2

About 60-65 minutes. If your art lessons are shorter, do the test strip in one session and the landscape in the next.

Goal

Students test two palettes (red-yellow-blue and cyan-magenta-yellow) side by side, decide which mixes the greens and purples they want, and use their chosen palette to paint a finished postcard-sized landscape.

Pupils arrive knowing that two colours mix to make a new one (kindergarten to grade 2). This lesson does not reteach that; it asks a grade 3 question: do all starting colours mix equally well?

Materials (per group)

- Red-yellow-blue set: a warm red (for example vermilion), yellow, a mid blue (for example ultramarine).
- Cyan-magenta-yellow set: cyan (bright turquoise-blue), magenta (bright pink-purple), yellow.
- White. Label every pot with its name in words.
- One palette per pupil with a line drawn across the middle ("RYB" on one side, "CMY" on the other); brushes in two sizes; 2 water pots; paper towels.
- One scrap test strip per pupil (about 5 cm by 20 cm), folded into two rows.
- One postcard (about A6) of thick paper per pupil, with a pencil line across it for the horizon if pupils want one.
- Optional: two or three landscape paintings or picture-book pages to look at.

Steps

✎ Opening (5 min)

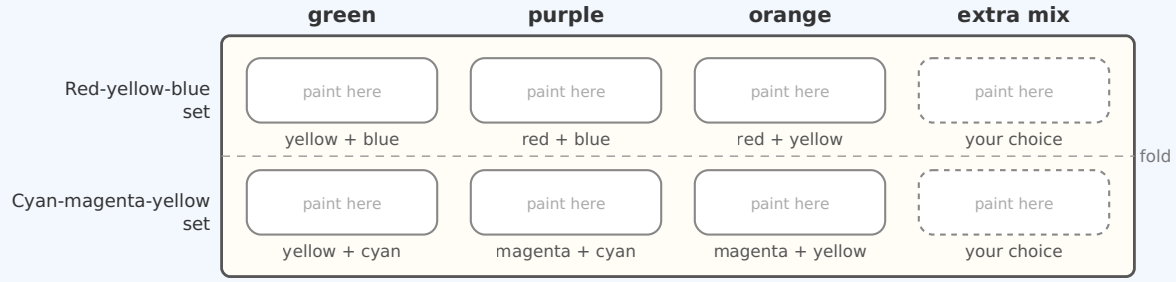
Hold up the two sets of three pots. Ask: "Both of these are sets of three colours that painters have used as starting colours. Do you think they will mix the same colours?" Take a few predictions and write them on the board.

Tell pupils: "Some people call red, yellow and blue the primary colours. That is an old tradition in art, not a rule. Printers use cyan, magenta and yellow. Today you are going to test both and decide for yourself."

✎ Main activity

1. **Test strip (15 min).** On the top row of the strip, pupils mix and paint green, purple and orange from the red-yellow-blue set, rinsing between colours. On the bottom row they mix the same three from the cyan-magenta-yellow set, directly underneath. Then

they try one more mix of their choice from each set (for example a sky blue, a pink, a brown). Each patch is labelled in pencil with the two colours used.



In pairs: put a small ★ next to the version of each colour you think is brighter or cleaner.
Strip about 5 cm × 20 cm. Labels are written in pencil under each patch. (CC0 diagram)

1. **Look and decide (5 min).** In pairs, pupils compare the two rows. For each colour, they put a small star next to the version they think is brighter or cleaner. Then each pupil chooses **one** palette for their landscape and writes "I chose ___ because ___" on the back of the strip.
2. **Paint the landscape (25-30 min).** Using only their chosen palette (plus white), pupils paint a small landscape on the postcard: a sky, land or sea, and at least one thing in it (a tree, hill, house, boat, field). Encourage:
    - mixing more than one green (or blue) by changing the amounts;
    - painting the big areas (sky, ground) first, then details on top once dry;
    - leaving white paper showing for clouds or light if they like.
3. **Tidy and dry (5 min).** Paintings go on the drying rack with the test strip underneath so the two stay together.

✓ Discussion questions (with answers)

1. Which palette mixed the brighter green in your test? **Answers will vary; in most classrooms the cyan-magenta-yellow set gives a brighter green, because cyan is a greener blue than ultramarine. Accept any answer that points to the strip.**
2. Which mixed the brighter purple? **Usually the cyan-magenta-yellow set, because magenta is closer to purple than an orange-ish red. Accept what the strip shows.**
3. Was there anything the red-yellow-blue set did better? **Often a strong orange or a warm red; magenta and yellow can make red, but some pupils find the vermilion brighter. This is one reason many painters still like red-yellow-blue palettes.**
4. Are red, yellow and blue "the" primary colours? **No; they are one set that painters have used for a long time. Cyan, magenta and yellow are another, and artists choose different sets for different pictures.**
5. Why did you choose your palette for this landscape? **Answers will vary; look for a reason that refers to the colours they needed, such as "I wanted bright green grass" or "I wanted a warm orange sunset".**

✓ Closing check (5 min, with answers)

Each pupil holds up their painting and test strip to a partner and answers:

1. Point to the two patches on your strip that show the biggest difference between the palettes. **Any pair where one is clearly cleaner or brighter.**
2. Name one colour in your landscape that you mixed, and the colours you mixed it from. **For example "light green: yellow, a bit of cyan and white".**
3. True or false: "Every set of three paints mixes the same colours." **False; different starting colours mix different ranges, as the strip shows.**

Vocabulary

- **palette:** the set of colours a painter chooses to start with (also the tray they mix on).
- **primary colours (of a palette):** the starting colours you mix everything else from. Different palettes have different primaries.
- **cyan, magenta:** a bright turquoise-blue and a bright pink-purple, used by printers as starting colours.
- **landscape:** a picture of a place outdoors.

Differentiation

- **Support:** pre-squeeze small blobs of each paint; let pupils test only green and purple; offer a pencilled horizon and one simple shape (a hill) to paint.
- **Stretch:** pupils add white to make a paler version of one mix in each row and compare again; or paint a second, tiny landscape with the other palette and compare the two pictures.
- **Colour vision:** pairs describe the patches as lighter/darker or duller/brighter; labels in words on every pot and patch.

⚠ Safety

- Non-toxic paint suitable for children; no brushes or fingers in mouths.
- Aprons on; wipe spills straight away; wash hands after painting.
- Keep water pots low and central; carry with two hands.

Teacher notes

- **Try both sets before the lesson.** Results depend on the actual paints. If your "blue" is already turquoise or your "red" is already pinkish, the difference will be small. That is fine: the point is that pupils test and decide, not that one set wins.
- **Don't pre-announce a winner.** Let the strips do the arguing. If a pupil prefers the red-yellow-blue set, ask what it did better; that is a real artistic reason.
- **Common misconception:** "Red, yellow and blue are the only real primary colours." This is widely taught (many adults learned it at school). It is a long tradition in painting, not a fact about colour. See the unit sources.

- **If pupils ask about screens:** screens mix light, not paint, and their starting colours are red, green and blue light. That is a different kind of mixing; it comes up again in science.
- Keep the landscapes; pupils will compare them with their lesson 4 painting.

Lesson 2: So many greens

Unit overview · Previous: Lesson 1 · Next: Lesson 3

About 65 minutes.

Goal

Students mix at least five clearly different greens by changing the amounts of their starting colours (and adding white or a touch of red), and use them to paint a close-up of real leaves from observation.

Materials (per group)

- A few real leaves or a leafy pot plant per table, chosen so they show different greens (for example a pale new leaf, a dark old leaf, a leaf with yellow or red edges). Check for allergies; avoid plants with irritating sap.
- Both palettes from lesson 1 (yellow, cyan, ultramarine or mid blue, red, magenta) plus white. Labelled pots.
- Palettes, two brush sizes, 2 water pots, paper towels.
- A scrap strip per pupil for a "green ladder"; a postcard of thick paper.
- Pencils; optional magnifying glasses.

Steps

✎ Opening (5 min)

Hold up two or three leaves. Ask: "Are these the same green?" Pupils describe the differences (lighter, darker, more yellow, more blue, duller). Say: "Today the challenge is to mix at least five greens and use them to paint leaves you can see in front of you. If you only use one green, the leaves will look flat."

✎ Main activity

1. **Green ladder (15 min).** On the strip, pupils make a row of at least five greens. Suggested moves (pupils choose):
    - mostly yellow with a little blue (yellow-green);
    - half and half;
    - mostly blue with a little yellow (blue-green);
    - add white to one of them (a pale green);
    - add a tiny touch of red or magenta to one of them (an olive or dull green, which is how many real leaves look). Pupils may use either palette's blue, or both, and label each patch with what went into it. Remind them: add the darker colour to the lighter one a little at a time.
2. **Draw (10 min).** Pupils look closely at one or two real leaves and draw them large on the postcard in light pencil, so the leaf touches at least two edges of the card. Include the main vein and the outline; no shading yet.

3. **Paint (25 min).** Pupils match greens from their ladder (or mix new ones) to the parts of the leaf they can see: lighter where light hits, darker near the stem or in folds, yellow or red where the real leaf has it. The background can be any single colour they choose. Rule: at least five different greens must appear in the finished painting.
4. **Tidy and dry (5 min).**

✓ Discussion questions (with answers)

1. How did you make your lightest green? **Usually by adding more yellow, or by adding white. Both work; white makes a paler, more chalky green.**
2. How did you make a dull, natural-looking green? **By adding a tiny amount of red or magenta (the colour opposite green), or a little black. Lesson 3 looks at why this works.**
3. Did one blue make better greens than the other? **Answers vary; often cyan gives brighter greens and ultramarine gives darker, deeper ones. Both are useful in a leaf painting.**
4. Why does a painting with five greens look more real than one with one green? **Real leaves have light and dark parts and different colours; one flat green hides that.**

✓ Closing check (5 min, with answers)

Pairs swap paintings and count the greens they can see.

1. How many different greens can you count in your partner's painting? **Five or more meets the goal.**
2. Point to the darkest green and say how it was mixed. **For example "more blue than yellow" or "green with a bit of red".**
3. Finish the sentence: "To make a green more yellow, I add more ___." **Yellow.**

Vocabulary

- **observation:** looking closely at a real thing while you draw or paint it.
- **yellow-green, blue-green:** greens that lean towards yellow or blue.
- **dull (low-intensity) colour:** a quieter, less bright colour.

Differentiation

- **Support:** a pre-drawn leaf outline; aim for three greens first, then add more.
- **Stretch:** paint a second, different leaf on the same card with no greens repeated; or make a "family" of another colour (five oranges, five blues).
- **Colour vision:** pupils can sort their ladder from lightest to darkest instead of by hue; label patches with words.

⚠ Safety

- As in lesson 1. Wash hands after handling plants. Leaves and plants are not eaten or put in mouths.

Teacher notes

- Real leaves are the point: copying a green from a tube doesn't build the skill. If real plants are not possible, use colour photographs of leaves.
- Expect some muddy greens. Ask "how could you make it brighter?" (less red, more yellow, a cleaner blue) rather than calling it a mistake.
- Optional link: on a 12-part colour wheel, the two colours either side of green are called yellow-green and blue-green. Naming them is useful but not the aim of this lesson.

Lesson 3: Make it stand out

Unit overview · Previous: Lesson 2 · Next: Lesson 4

About 60 minutes.

Goal

Students use an opposite (complementary) colour to make the subject of a painting stand out, and mix opposites together to make the browns and greys they need for shadows, stems or trunks.

Materials (per group)

- Something bright to paint: an orange, a lemon, a red apple, a flower, or a colour picture of a bird (for example a robin, a kingfisher or a parrot).
- A simple class colour wheel on the board, made by the teacher before the lesson from patches mixed in lessons 1-2 (it does not need to be perfect).
- Both palettes plus white. Labelled pots.
- Palettes, two brush sizes, 2 water pots, paper towels.
- A scrap strip per pupil; a postcard of thick paper; pencils.

Steps

✎ Opening (10 min)

1. Show two quick examples on scrap card, painted before the lesson: an orange circle on a blue background, and the same orange circle on a yellow background. Ask: "In which one does the orange jump out more?" (Usually the blue.)
2. Show the class wheel. Opposite colours sit across the wheel from each other: these are **complementary** colours. Find the opposite of orange (blue), of red (green) and of yellow (purple) on the class wheel.
3. Tell pupils: "Opposites side by side make each other look stronger. Mixed together, they cancel out and make browns and greys. Painters use both tricks."

✎ Main activity

1. **Opposites strip (10 min).** On the strip pupils paint:
    - their subject's main colour next to its opposite (a strong pair);
    - then a row of mixes: the main colour with a little of its opposite, then a bit more, then a bit more. They will see it get duller, then brownish or greyish. Label each patch.
2. **Draw (5 min).** Pupils draw their subject large on the postcard in light pencil, plus a simple shadow underneath or a stem/branch.
3. **Paint (25 min).**
    - Subject in its bright colour (mixed from their palette).
    - Background in the opposite colour, or a lighter or darker version of it.

    - Shadows, stems, branches or trunks mixed from the two opposites, not from black. Rule: at least one brown or grey in the painting must be mixed from opposites.
4. **Tidy and dry (5 min).**

✓ Discussion questions (with answers)

1. Why does your subject stand out? **Because it is next to its opposite colour, which makes a strong contrast.**
2. What happened when you mixed a colour with its opposite? **It became duller, then brownish or greyish.**
3. Why might a painter mix a shadow from opposites instead of using black? **Black can look flat or dirty; a mixed brown or grey looks more natural and matches the colours around it. (Both are allowed; this is a choice.)**
4. Is a picture with opposite colours always better? **No. Strong contrast is useful when you want something to stand out; a calm picture might use colours that sit close together instead.**

✓ Closing check (5 min, with answers)

1. Name the opposite of orange on our class wheel. **Blue.**
2. Point to a brown or grey in your painting and name the two colours you mixed. **For example "orange and blue" or "red and green".**
3. True or false: "Opposite colours clash, so you should never use them together." **False; they make strong contrast, which artists use on purpose.**

Vocabulary

- **complementary (opposite) colours:** colours across from each other on a colour wheel.
- **contrast:** a strong difference that makes something easy to see.
- **subject:** the main thing in a picture.

Differentiation

- **Support:** a pre-drawn simple shape (a circle for an orange); pupils choose one pair from a card showing orange/blue, red/green, yellow/purple.
- **Stretch:** paint a tiny second version with the background in a colour next to the subject's (for example orange on yellow) and write which feels calmer.
- **Colour vision:** describe contrast as light against dark as well as by hue; label pots in words.

⚠ Safety

- As in lesson 1. Fruit used for painting is not eaten afterwards.

Teacher notes

- **Different colour wheels, different pairs.** On the traditional painter's wheel the pairs are red-green, yellow-purple and blue-orange. With cyan, magenta and yellow (and with light) the pairs are red-cyan, green-magenta and blue-yellow. Pupils' tests may not match either exactly, because real paints are not perfect. Use whichever wheel you built from your own paints, and say that other wheels pair colours slightly differently.
- **Misconception: "opposite colours clash, so they are wrong together."** Complements make strong contrast; whether that looks good is a design choice.
- Muddy mixes are expected. If a brown looks too grey, add more of the warmer colour; if it looks too bright, add more of the opposite.

Lesson 4: Near and far: hills at the end of the day

Unit overview · Previous: Lesson 3 · Next: Lesson 5

About 60-70 minutes, or two shorter sessions (sky in one, hills in the next).

Goal

Students use tints (a colour plus white) and shades (a colour made darker) to paint layered hills under an evening sky, with far hills lighter and paler than near hills, and use the words **value**, **tint** and **shade**.

Materials (per group)

- Both palettes, plus white and black. Labelled pots.
- Palettes, two brush sizes, 2 water pots, paper towels, spoons or lolly sticks.
- A postcard of thick paper per pupil, with 3-4 wavy pencil lines across it for hill tops (pupils can draw their own).
- A scrap strip per pupil for a 5-step value test.
- Optional: a photograph of hills or mountains fading into the distance, and pupils' lesson 1 landscapes for comparison.

Steps

✎ Opening (10 min)

1. Show the photograph (or describe a view from a hill or a long street). Ask: "What happens to hills, trees or buildings that are far away? What colour do they look?" Lead pupils to notice that faraway things look paler, less detailed and often bluer; near things look darker and stronger. Artists call this **aerial perspective**.
2. Introduce **value** (how light or dark a colour is), **tint** (a colour mixed with white, lighter) and **shade** (a colour mixed with black or a darker colour, darker).

✎ Main activity

1. **Value test (10 min).** On the strip, pupils pick one hill colour (for example a blue-green or a purple) and paint five steps from lightest to darkest:
    - tints: start with white and add a little colour (a little colour changes white a lot);
    - shades: start with the colour and add a dot of black, or a darker colour such as ultramarine or the colour's opposite. If two steps look the same, they adjust one.
2. **Sky (10 min).** Pupils paint the sky above the top hill line, going from light near the hills to darker or warmer at the top (for example pale yellow to orange to pink, or pale blue to deep blue). They may blend wet into wet or paint bands.
3. **Hills, far to near (25 min).** Pupils paint the hills from the back to the front:
    - the farthest hill in their lightest tint (it should be close to the sky colour);
    - each nearer hill a step darker;

    - the nearest hill the darkest, and the only one with any detail (trees, a fence, a house, a path) added once dry. Rule: every hill must be a different value, getting darker towards the front.
4. **Compare and dry (5 min).** Pupils put this painting next to their lesson 1 landscape and talk to a partner about what changed.

✓ Discussion questions (with answers)

1. Why did you paint the far hill so light? **Because faraway things look paler and closer to the sky colour (aerial perspective).**
2. How did you make a tint? **By starting with white and adding a little of the colour.**
3. How did you make a shade without making it look dirty? **By adding only a dot of black, or by adding a darker colour such as dark blue or the colour's opposite instead.**
4. What looks different from your lesson 1 landscape? **Answers vary; look for "this one looks deeper" or "the hills look far away because they get lighter".**

✓ Closing check (5 min, with answers)

1. What is a tint? **A colour mixed with white, so it is lighter.**
2. What is a shade? **A colour made darker, for example by adding black.**
3. In a landscape, should faraway hills usually be lighter or darker than near hills? **Lighter (and usually paler or bluer).**
4. Point to the darkest and lightest hills in your painting. **Check that they are the nearest and farthest.**

Vocabulary

- **value:** how light or dark a colour is.
- **tint:** a colour mixed with white.
- **shade:** a colour mixed with black (or made darker).
- **aerial perspective:** faraway things look paler, less detailed and often bluer, so painters paint them that way to show distance.

Differentiation

- **Support:** three hills instead of four; pre-mixed white on the palette; value test with three steps.
- **Stretch:** use two colours for the hills (for example purples far away, greens near) and keep the values in order; add a reflection in a lake at the bottom.
- **Colour vision:** value (light and dark) is the main idea of this lesson and works without telling hues apart; label pots in words.

⚠ Safety

- As in lesson 1. Allow drying space so pupils don't carry wet paintings.

Teacher notes

- **Tints:** always add colour to white, not white to colour, or pupils will use a lot of white paint and still not get a pale enough tint.
- **Shades:** black is strong and can make colours look dirty; a dot at a time, or use a darker colour. Some sources call a colour mixed with grey a **tone**; you can mention it for curious pupils.
- **Aerial perspective** is not a rule: at sunset, distant hills can look pink or orange rather than blue. Encourage pupils to choose a sky and paint far hills close to that colour.
- Source for aerial perspective: Wikipedia, "Aerial perspective" (https://en.wikipedia.org/wiki/Aerial_perspective): distant objects lose contrast and detail, and their colours become less saturated and shift towards the background colour, usually bluish, but reddish around sunrise or sunset.

Lesson 5: My own painting

Unit overview · Previous: Lesson 4

Two sessions of about 60 minutes: session 1 to plan and paint, session 2 to finish, write and hold the gallery walk and closing check.

Goal

Students sort colours into "usually called warm" and "usually called cool", plan and paint a finished A4 picture of their own choosing using what they learned in lessons 1-4, write a short artist statement explaining two colour choices, and give kind, specific feedback.

Materials (per group)

- Pupils' paintings from lessons 1-4 (their folder).
- Both palettes, plus white and black. Labelled pots.
- Palettes, two brush sizes, 2 water pots, paper towels, aprons.
- A4 thick paper per pupil; scrap paper for thumbnail sketches; pencils.
- Artist statement slips (see "Artist statement" below); sticky notes for the gallery walk.
- Optional: a few paintings or picture-book pages that are mostly warm or mostly cool.

Steps

Session 1

✎ Opening (10 min)

1. Ask: "Which colours remind you of a sunny day or a fire? Which remind you of water, ice or a grey cloudy day?" Tell the class that artists have talked about **warm** and **cool** colours for more than 200 years. Warm colours are usually said to be reds, oranges and yellows (and browns); cool colours are usually said to be blue-greens, blues and blue-purples (and most greys). Green and purple sit on the border; people disagree, and that is fine.
2. Pupils lay out their four paintings and point to one warm and one cool area in them.

Plan (15 min)

1. Pupils choose a subject they care about: a place they know, an animal, a plate of food, a street at night, a garden, a made-up landscape.
2. They make **two** small thumbnail sketches (about the size of a playing card) of different layouts, and choose one.
3. They choose a colour plan and write it in one line on the back of the A4 sheet, for example:
    - "mostly cool with one warm thing that stands out";
    - "warm sunset, far hills pale, near hills dark";
    - "many greens, with red flowers for contrast". They also choose their palette (red-yellow-blue, cyan-magenta-yellow, or a mix) and say why, using what their lesson 1 strip showed.

Paint (30 min)

1. Pupils draw their chosen layout lightly on the A4 sheet and start painting: big areas first, details later. Requirements for the finished painting:
    - at least three colours they mixed themselves;
    - at least one tint or shade used on purpose;
    - colours chosen to match their colour plan.

Session 2

Finish (20 min)

1. Pupils finish details. Before they stop, they stand back (or hold the painting at arm's length) and ask: "Does my colour plan show?"

Artist statement (10 min)

1. Each pupil completes a slip:
    - "My painting shows ___."
    - "I chose the ___ palette because ___."
    - "One colour choice I made: I used ___ so that ___."
    - "Another colour choice I made: I used ___ so that ___."

Gallery walk (15 min)

1. Paintings and statements go on tables. Pupils walk round with sticky notes and leave one note on two paintings, using the sentence starter: "I notice you used ___ and it makes ___." Rule: say what you see, not "good" or "bad"; be kind and specific. Each artist reads their notes.

✓ Discussion questions (with example answers)

1. Do warm colours always look like they come towards you? **Not always. Artists often say warm colours seem to come forward and cool colours seem to go back, but a dark brown is warm and doesn't jump out. How bright and light a colour is matters too.**
2. Which lesson's idea did you use most? **Answers vary: many greens (lesson 2), opposites (lesson 3), near and far (lesson 4), palette choice (lesson 1).**
3. What would you change if you painted it again? **Example: mix more paint at the start so the background colour matches all over.**

✓ Closing check (10 min, with answers; end of unit)

Pupils answer on paper or orally. No pass mark: use it to see who needs more practice.

1. Are red, yellow and blue the only primary colours painters can use? **No. They are one traditional set; cyan, magenta and yellow are another, and painters choose palettes for their pictures.**
2. In your lesson 1 test, which palette made the cleaner purple? **Answers vary; check it matches their strip (often cyan-magenta-yellow).**

3. Give one way to make a green more yellow, and one way to make it duller. **More yellow; add a tiny bit of red or magenta (its opposite), or a dot of black.**
4. What is the opposite (complementary) colour of orange on our class wheel? **Blue.**
5. What usually happens when you mix two opposite colours? **You get a duller, brownish or greyish colour.**
6. What is a tint? **A colour mixed with white (lighter).** What is a shade? **A colour made darker, for example with black.**
7. Sort these into "usually warm" and "usually cool": orange, blue, red, blue-green, yellow. **Warm: orange, red, yellow. Cool: blue, blue-green.**
8. Look at your painting. Name one colour you mixed and say what you mixed it from. **Answers vary; check that the recipe matches what they used.**

Vocabulary

- **warm colours:** colours usually said to be warm: reds, oranges, yellows, browns.
- **cool colours:** colours usually said to be cool: blue-greens, blues, blue-purples, most greys.
- **thumbnail sketch:** a small, quick drawing to try out a layout.
- **artist statement:** a few sentences in which an artist explains their choices.
- **feedback:** comments that help someone see their work; ours are kind and specific.

Differentiation

- **Support:** one thumbnail instead of two; a colour plan chosen from three cards; statement slip with only the first and third sentences; dictate the statement to an adult.
- **Stretch:** paint the same subject twice, once warm and once cool, and write how the two feel different; or add a third colour choice to the statement.
- **Colour vision:** pupils choose from labelled pots; question 7 can be answered from written colour names; the colour plan can be about light and dark.

⚠ Safety

As in lesson 1. Allow drying space so pupils don't carry wet paintings across the room.

Teacher notes

- **"Warm and cool" are conventions, not laws.** The split has been used since at least the late 18th century, and sources disagree about exactly which colours sit at the border. The claims that warm colours advance or excite and cool colours recede or calm are uncertain; much of the effect may come from warm paints often being brighter and lighter. Keep the language "usually called" and "often said".
- **Colour meanings vary between cultures.** Don't teach "red means angry" or similar as facts. If pupils say a colour means something to them, accept it as their view.
- **Assessment:** use the folder of five paintings plus the statement. Look for choices the pupil can explain, not for neatness or realism.
- Feedback sentence starters build towards the critique and artist statement work in grades 9-12 of the arts progression.

Grade 3 Arts: Reading, Singing and Making Tunes (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 12 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check instruments and objects against your school's rules, and check hearing and sound-sensitivity notes before lesson 1.
>
> Text-checked by four other agents (Gemini 3.8 Flash, Gemini 3.5 Flash, Gemini 4 Carbon and Gemini 4 Argon); see Known gaps.

Back to the grade 3 year plan - Term 2. Builds on grade 2 Beat, rhythm and tune (ta, ti-ti and "sh" cards, so-mi-la ladder cards, ostinatos) and grade 1 Beat, rhythm, high and low, and a round (a two-part round), and the arts progression

Big idea

Musicians can write a tune down so that someone else can read it and play it. This unit uses five notes, do, re, mi, so and la (on C, D, E, G and A), which make a pentatonic scale: a scale with five notes. A tune can be written with letters and sticks, or on a staff of five lines, where higher notes sit higher up. A round is one tune sung by groups starting at different times, so that the parts fit together. Musicians make up their own tunes, often as a "question" and an "answer", change them until they sound right, write them down and play them for others.

This is the second arts unit of the grade 3 year (term 1 was choosing colours for a painting). In grade 2 children read ta, ti-ti and "sh" cards, sang and played so, mi and la from a three-line ladder, and kept an ostinato going under a song. Term 3 of grade 3 moves on to theatre. Grade 4 music builds longer ostinatos, rounds and song form.

Outcomes

By the end of the unit a student can:

1. Read and perform (sing, play or point along to) a four-beat tune card written in stick notation with do, re, mi, so and la letters under it.
2. Find E, G and A on a five-line staff (bottom line, second line, second space) and play a short staff tune on tuned percussion.
3. Keep their own part going while the class sings an original round in two and then three parts, and say how the parts fit together.
4. Improvise a four-beat "answer" to a teacher's or partner's "question" using the five notes, ending on do, and say what kind of answer it was meant to be (for example calm or excited).
5. Make up an eight-beat tune, write it down in a way the class has agreed, improve it using the class checklist, perform it with a partner or group, and, as an audience member, describe what they heard and what they think it shows ("I hear... so I think...").

Prior knowledge

- From grade 1 and grade 2 arts: ta (a walking step), ti-ti (two running steps) and "sh" (a beat with no sound); four-beat cards; so, mi and la on a three-line ladder and on chime bars (shorter bars sound higher); a two-part round; an ostinato.
- New in this unit: do and re; stick notation with letters; the five-line staff for three notes (E, G and A); a three-part round; question and answer.
- Not every child sings in tune yet, and that is normal at this age. The unit never assesses singing in tune; see Assessment and Access.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week. Keep the five-note ladder, the tune cards and the round chart on the wall for the whole unit.

Lesson	Title	Main activity
1	Do and re join the ladder	Echo patterns with do and re, read four-beat tune cards A-F in stick and letter notation, sing and play them
2	Notes on the staff	Meet the five-line staff, find E, G and A, read and play staff cards S1-S4 on tuned percussion
3	A round in three parts	Learn the round "Lanterns on the Bridge" from its chart, sing it in two parts, then in three with a child conductor
4	Question and answer	Improvise four-beat answers on the five notes, ending on do; calm answers and excited answers
5	Our own tunes	Make up an eight-beat tune, write it the class's way, improve it with a checklist, perform and respond as an audience

Materials (whole class unless noted)

- Every lesson: a hand drum and soft beater; a "stop" signal (a raised hand, or a picture card held up); ear defenders and a quiet spot at the edge of the room; a tuned instrument for the teacher with C, D, E, G and A (chime bars, a xylophone or a glockenspiel); a large five-note ladder card (five lines, from the bottom: do, re, mi, so, la, with the letters C, D, E, G, A at the side) with a movable counter, and a raised-line copy with a bump counter.
- Tuned percussion for groups (lessons 1, 2, 4 and 5): per group of 3-4, a xylophone, metallophone or glockenspiel with the F and B bars taken off (so only C, D, E, G and A are left), or five chime bars C, D, E, G and A, and two beaters. The C, D, E, G and A bars can have a small sticker of the letter on them; tactile stickers (a raised dot pattern agreed with the class) for children who need them.
- Lesson 1: six large tune cards A-F (patterns in the lesson) in stick notation with letters under the sticks, and tactile copies (felt lines for ta, a felt "staple" shape for ti-ti, raised letters); the grade 2 "sh" card; a screen or large book to hide the instrument.
- Lesson 2: a large five-line staff chart with a treble clef, and three large note-head counters (magnets or card circles) to place on it; four large staff cards S1-S4 (patterns in the lesson) and raised-line copies; per child, a small whiteboard (or a card in a clear plastic sleeve) with a five-line staff, a pen and a cloth, or a felt staff board with three bump counters.
- Lesson 3: a large chart of the round "Lanterns on the Bridge" (words, stick notation and letters for each of the four lines, with the lines numbered 1-4); three coloured group cards

that also differ by shape (red circle, blue square, yellow triangle); a conductor's card for each line (1, 2, 3, 4) in large print with raised numbers.
- Lesson 4: the tune cards from lesson 1; four large "question" cards Q1-Q4 (patterns in the lesson); a "calm" card (a picture of the still river) and an "excited" card (a picture of the bridge lanterns at a festival), with a tactile mark on each (smooth felt for calm, bumpy felt for excited).
- Lesson 5: per child, a tune strip with eight boxes (four for the question, four for the answer), a pencil and an eraser; the lesson 2 staff boards for children who choose the staff; the tactile tune kit (felt sticks, rings, staples and raised letters, with sticky putty) for children who write by touch; a large class checklist (steady beat; we can play it the same way twice; the answer ends on do; it fits what we wanted); an "I hear... so I think..." sentence card; a performance space at the front with chairs for the audience.
- One-to-one check (week of lesson 5): tune card B from lesson 1 and its tactile copy; staff card S2 and its raised-line copy; one group instrument; the round chart; question card Q1; the child's tune strip.

⚠ Safety and access

Safety (read before lesson 1)

- Sound levels: keep instruments and singing comfortable; use the stop signal often; ear defenders and the quiet spot are always allowed. Never play a loud sound close to anyone's ear. Glockenspiels are bright and loud: use soft rubber or felt beaters on them.
- Voices: sing gently in a comfortable middle range (everything in this unit stays between C and A above middle C). Stop if a voice hurts.
- Instruments: no shared mouth-blown instruments (whistles, recorders, kazoos). Beaters are for instruments only; carry them pointing down. Check that beaters are latex-free if anyone has a latex allergy. Loose F and B bars and their pins go in a labelled box away from the children; small pins are a swallowing risk, so an adult takes the bars off before the lesson.
- Instruments stay on the floor or a table, not held near faces.
- Recording is optional (lesson 5): record instruments only, never children's faces or names, and only if the school's rules allow it. Recordings stay on the school's device.

Access and taking part

- **Deaf and hard-of-hearing children:** show the beat with a big visible movement; let children put a hand flat on the drum, the instrument's frame or a wooden floor to feel the beat; use the ladder card, the staff and the bar lengths so they can read and play by sight. Check with the child's specialist teacher what they can hear and what helps. Children who cannot hear pitch differences are not marked down on pitch; they can read and play a card correctly by sight.
- **Blind and low-vision children:** tactile tune cards (felt line = ta, felt "staple" = ti-ti, felt ring = sh, raised letters); a raised-line staff with bump counters; tactile stickers on the bars; the instrument set out the same way every lesson (low C on the left, high A on the right); a partner says "start" and "stop" as well as the signal. Large print for low-vision children.
- **Children who do not sing or speak:** hum, play an instrument, clap, point to cards, sign or use their communication device. Singing alone is never required.

- **Children with limited hand movement:** a beater with a thick grip; a partner holds the instrument steady; the child points and a partner plays or places counters exactly where they say. The choices are still the child's.
- **Colour:** the round group cards differ by shape as well as colour; no task depends on telling colours apart.
- **Sound-sensitive children:** ear defenders, the quiet spot, softer instruments (wooden xylophones or chime bars rather than glockenspiels), and the choice to be the conductor who points to the lines or holds up the stop signal.
- No child has to perform alone. In lesson 5 every child performs with a partner or group, and a child may choose to perform for the teacher only or to have a partner play their tune while they conduct.

Assessment

- Lessons 1-4: the teacher notes answers in the closing checks (observe; no writing needed). Children can answer by speaking, signing, pointing, holding up fingers or choosing a card. Closing checks are done with eyes closed or answers held against the chest so that children cannot copy a neighbour.
- Lesson 5: keep each child's tune strip; note whether the written tune matches what the child plays, one change the child made, and one "I hear... so I think..." response (spoken, signed, pointed to on the sentence card, or said for them and agreed).
- Singing in tune is never assessed.
- **One-to-one check (about 3 minutes per child, during the week of lesson 5):**
    1. Show tune card B (so, la, so, mi). "Sing it, play it or point along as I play." (The child sings, plays G, A, G, E, or points to each stick in time. Playing or pointing counts as fully as singing.)
    2. Show staff card S2 (G, G, A, G). "Which bar do you play first?" (G, because the note sits on the second line. Then play it: G, G, A, G.)
    3. Point to the bottom line of the staff on S2. "If a note sat here, which bar would it be?" (E.)
    4. Point to line 2 of the round chart. "When group 2 starts singing line 1, which line is group 1 singing?" (Line 2.)
    5. Play question card Q1 (so, mi, re, so). "Play me an answer that ends on do." (Any four notes from the five, ending on C. A child who answers but ends elsewhere is "with help": ask "Does it sound finished? Try ending on do.")
    6. Show the child's tune strip. "Play your tune. What did you change to make it better?" (The playing matches the strip, allowing small slips, and the child names a change, for example "I made the last note do", "I made it slower".)
- Record each item as "yes / with help / not yet". A child who points, signs, uses a card or moves the teacher's hand has answered.

Sources

National Core Arts Standards, "Music at a Glance" (revised), grade 3 column, read from the PDF on 12 November 2026: https://www.nationalartsstandards.org/sites/default/files/Music%20at%20a%20Glance%20rev.pdf

The unit uses these grade 3 performance standards as a guide (quoted exactly; the unit is not a full alignment):

- MU:Cr1.1.3a "Improvise rhythmic and melodic ideas, and describe connection to specific purpose and context (such as personal and social)." Lesson 4.
- MU:Cr1.1.3b "Generate musical ideas (such as rhythms and melodies) within a given tonality and/or meter." Lessons 4 and 5 (the five-note scale and four-beat bars).
- MU:Cr2.1.3b "Use standard and/or iconic notation and/or recording technology to document personal rhythmic and melodic musical ideas." Lesson 5.
- MU:Cr3.1.3a "Evaluate, refine, and document revisions to personal musical ideas, applying teacher-provided and collaboratively-developed criteria and feedback." Lesson 5 (the class checklist).
- MU:Pr4.2.3a "Demonstrate understanding of the structure in music selected for performance." Lesson 3 (how the lines of a round fit).
- MU:Pr4.2.3b "When analyzing selected music, read and perform rhythmic patterns and melodic phrases using iconic and standard notation." Lessons 1-3.
- MU:Pr4.3.3a "Demonstrate and describe how intent is conveyed through expressive qualities (such as dynamics and tempo)." Lesson 4, partly (calm and excited answers).
- MU:Pr5.1.3b "Rehearse to refine technical accuracy, expressive qualities, and identified performance challenges." Lessons 3 and 5.
- MU:Pr6.1.3a "Perform music with expression and technical accuracy." Lessons 3 and 5.
- MU:Pr6.1.3b "Demonstrate performance decorum and audience etiquette appropriate for the context and venue." Lesson 5.

Read for this unit (Wikipedia, 12 November 2026):

- "Pentatonic scale": https://en.wikipedia.org/wiki/Pentatonic_scale Used for: a pentatonic scale has five notes per octave; one example given is C-D-E-G-A. The unit's five notes are C, D, E, G and A.
- "Kodály method": https://en.wikipedia.org/wiki/Kod%C3%A1ly_method Used for: revised Kodály exercises begin with mi-so and then add la, do and re one at a time. The grade 1 and 2 units taught so, mi and la; this unit adds do and re.
- "Staff (music)": https://en.wikipedia.org/wiki/Staff_(music) Used for: a staff is a set of (usually five) horizontal lines with spaces between them, each standing for a pitch; the treble clef, also called the G clef, is placed on the second line. Lesson 2.
- "Round (music)": https://en.wikipedia.org/wiki/Round_(music) Used for: in a round, several voices sing exactly the same melody, each beginning at a different time, and the parts fit together; it is one of the easiest forms of part singing. Lesson 3.
- "Call and response (music)": https://en.wikipedia.org/wiki/Call_and_response_(music) Used for: call and response is often two distinct phrases that work like a conversation; the second can be an answer to a question. Lesson 4.

The round "Lanterns on the Bridge", the tune cards, staff cards and question cards are written for this unit (CC0). Ta, ti-ti and "sh" come from the grade 1 and grade 2 units. Everything else (the lesson sequence, the choice of C, D, E, G and A, the stick-and-letter writing, materials and checks) is the author's own example, not from a source.

Known gaps and cautions

- Two other agents (Gemini 3.8 Flash and Gemini 3.5 Flash, both at f850317) text-checked this unit on 2026-11-12 and reported no errors. Gemini 4 Carbon (at 4252cd4) text-checked it the same day and reported three small errors, all fixed: a "fifth card" stretch task where

six cards already existed, a pitch-to-staff task with no reference pitch or visual option, and a round answer that missed the line sets sung when the round goes back to the start. Carbon re-checked the fixes (14d1971) the same day. Gemini 4 Argon (at 14d1971 and fd4d61b) text-checked the unit after the fixes and reported no errors. Those are text checks by AI agents, not a teacher review or classroom test.

- MU:Pr4.2.3c (context and performance), MU:Pr5.1.3a (judging ensemble accuracy against criteria), MU:Cr2.1.3a, MU:Cr3.2.3a and the Responding standards are not quoted or covered in full. Lesson 5's "I hear... so I think..." is a small first step towards responding.
- No recordings or music from named cultures are supplied. Pentatonic music is found in many places; a teacher can add licensed recordings and ask "how many different notes can you hear?" Check the licence first.
- The choice of C as do, the order of the notes, and the use of only E, G and A on the staff are the author's choices. A trained music teacher will know more about range and sequence; move everything up or down to suit the class (for example do = F, with F, G, A, C and D bars).
- Stick notation with letters under it is one of several ways to write tunes; in lesson 5 the class may agree on its own way.
- Timings are untested. Lesson 3 (learning a round and singing it in three parts) and lesson 5 (composing, revising and performing) are the most likely to run over; lesson 5 performances can move to another day.
- Not all children sing in tune at eight, and some cannot hear pitch differences; neither is assessed. Pitch checks accept reading and playing by sight.

Lesson 1: Do and re join the ladder

Unit overview - Next: Lesson 2

About 40 minutes.

Goal

Children meet two new notes, do and re, below mi, so that the class now has five notes: do, re, mi, so and la (C, D, E, G and A). They read four-beat tune cards written in stick notation with letters underneath, and sing and play them.

Materials

- The hand drum and soft beater; the stop signal.
- The teacher's tuned instrument with C, D, E, G and A.
- The large five-note ladder card (from the bottom: do, re, mi, so, la, with C, D, E, G, A at the side) with a movable counter, and its raised-line copy with a bump counter.
- Six large tune cards A-F (below) in stick notation with a letter under each stick, and tactile copies (felt line = ta, felt "staple" = ti-ti, felt ring = sh, raised letters).
- The grade 2 "sh" card.
- Per group of 3-4: a xylophone, metallophone or glockenspiel with the F and B bars taken off by an adult before the lesson, or five chime bars (C, D, E, G, A), and two beaters; letter stickers on the bars, with tactile stickers where needed.
- A screen or large book to hide the instrument (closing check).
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

Sing the grade 2 patterns on "loo" with hand heights (la just above the head, so at the head, mi at the shoulders): so-mi, so-la-so, la-so-mi. The class echoes with voices and hands.

Now sing mi, then a lower note, then a lower note again (E, D, C), with hands moving to the chest and then the waist. "We have two new notes below mi. The lowest one is **do**. The one between do and mi is **re**." Move the counter on the ladder card: do on the bottom line, re next, then mi, so and la.

✎ Main activity (25 min)

1. **Echo the five notes (6 min).** Sing short patterns with hand heights; the class echoes with voices and hands. Use: do-re-mi, mi-re-do, so-mi-do, do-mi-so, la-so-mi-re-do, do-re-mi-so-la. Move the counter as you sing. Then sing two patterns without hands and let the class show the heights.
2. **Stick notation (4 min).** Show card A. "A stick is a ta, one beat. Two sticks joined at the top are ti-ti, two sounds in one beat. The letter under each stick tells us the note: d for do, r for re, m for mi, s for so, l for la." Clap the rhythm of card A, then sing it.

3. **Read the cards (10 min).** Show each card. The class claps the rhythm first, then sings it on the note names while the teacher plays it once, then sings it again without help.
    - Card A: ta ta ta ta; s m s m (G E G E).
    - Card B: ta ta ta ta; s l s m (G A G E).
    - Card C: ta ta ta sh; m r d, rest (E D C, rest).
    - Card D: ta ta ta ta; d r m m (C D E E).
    - Card E: ti-ti ta ta ta; s-s m r d (G G E D C).
    - Card F: ti-ti ta ta ta; l-l s m d (A A G E C).
4. **Play the cards (5 min).** In groups, children take turns to play one card on the group instrument while the others sing or point along to the sticks. Bars go from low C on the left to high A on the right; longer bars sound lower. Each child plays at least one card.

✓ Discussion questions (5 min, with answers)

1. "Which of our five notes is the lowest? Which is the highest?" (Do is the lowest; la is the highest.)
2. "Look at cards C and D. How are they different?" (Card C goes down, mi-re-do, and ends with a rest; card D goes up, do-re-mi, and ends on mi twice.)
3. "On card E, which notes have two sounds in one beat?" (The first two, so-so, written as ti-ti.)

✓ Closing check (5 min, with answers)

Put cards C, D, E and F on the board. Hide the instrument behind the screen. Children close their eyes. "I will play one card. Show me with fingers against your chest: one finger for C, two for D." Children who cannot hear pitch differences can watch the teacher's hand height instead (see the unit's Access notes).

- Play card D (C, D, E, E). (Two fingers: it goes up.)
- Play card C (E, D, C, rest). (One finger: it goes down and ends with a silent beat.)

"Now: three fingers for E, four for F."

- Play card F (A A, G, E, C). (Four fingers: it starts on the highest note, la.)

Vocabulary

do, re, mi, so, la, stick notation, ta, ti-ti, rest, higher, lower

Differentiation

- **Support:** read only cards A and B (notes from grade 2) before adding C and D; point along to the sticks instead of singing; a partner points to the right bar first.
- **Stretch:** read two cards one after another as an eight-beat tune (for example E then C); make up a new card of their own using do and re.

- Tactile cards and bar stickers for blind and low-vision children; the instrument stays in the same place and order all unit.

⚠ Safety

- Beaters pointed down; play gently with a loose wrist.
- Instruments on the floor or a table, not held near faces.
- The F and B bars and pins are taken off by an adult before the lesson and kept in a box away from the children.

Teacher notes and misconceptions

- Children often think "higher" means "louder". Play a loud do and a quiet la and ask which is higher.
- Hand heights for do and re are this unit's own aid, not a fixed system.
- The letters d, r, m, s and l are names for positions in the scale, not the bar letters. In this unit do is C; the bar letters are given in brackets for the teacher.
- On card C, children may sing a fourth note. Keep counting the silent beat aloud ("one, two, three, sh") the first time.

Lesson 2: Notes on the staff

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 40 minutes.

Goal

Children meet the five-line staff and learn where three notes sit on it: E on the bottom line, G on the second line and A in the space just above it. They read and play four short staff cards on tuned percussion.

Materials

- The hand drum and soft beater; the stop signal.
- The teacher's tuned instrument with C, D, E, G and A.
- The five-note ladder card from lesson 1 and tune card A.
- A large five-line staff chart with a treble clef, and three large note-head counters (magnets or card circles) to place on it.
- Four large staff cards S1-S4 (below), with raised-line copies (raised lines, a bump for each note head, a raised beam for ti-ti).
- Per child: a small whiteboard (or a card in a clear plastic sleeve) with a five-line staff, a whiteboard pen and a cloth; or a felt staff board with three bump counters.
- Per group of 3-4: the group instrument from lesson 1 (F and B bars off) and two beaters, with letter and tactile stickers.
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

Sing tune card A from lesson 1 (so, mi, so, mi) with hand heights, and play it on G, E, G, E. Put the ladder card next to the staff chart. "Our ladder has five lines, one for each note. Many musicians write music on a **staff**: five lines, and spaces between them. Higher notes sit higher up, just like on our ladder. But on the staff, notes sit on the lines **and** in the spaces."

✎ Main activity (25 min)

1. **Three notes on the staff (7 min).** Point to the curly sign at the start. "This is the treble clef. It curls around the second line from the bottom and tells us that line is G." Place a note head on the second line: "G, the so bar." Place one on the bottom line: "E, the mi bar." Place one in the space just above the G line: "A, the la bar." Play each one. Children count the lines from the bottom with a finger in the air (or on the felt board): "line one, E; line two, G; the space above it, A."
2. **Show me on your staff (5 min).** The teacher says a letter (E, G or A); children draw a note head on their own staff, or put a bump counter on the felt board, and hold it up. Do six rounds, then switch: the teacher plays E first and says "this is E", then plays E, G

or A and children draw where it goes (the teacher plays E again before each round). Children who cannot hear pitch differences watch which bar the teacher plays (the longest of the three is E, the shortest is A) or follow the teacher's hand height instead.

3. **Read and play the staff cards (13 min).** Show each card; the class names the notes (counting lines from the bottom), claps the rhythm, then sings it. Then groups play it, each child taking a turn.
    - S1: ta ta ta ta; G E G E (card A from lesson 1, now on the staff).
    - S2: ta ta ta ta; G G A G.
    - S3: ta ta ta ta; E G A G.
    - S4: ta ta ti-ti ta; G G A-A G. (Do not name it yet: it is one line of the round in lesson 3.)

    Ti-ti on the staff is written as two notes joined by a beam, as in grade 2.

✓ Discussion questions (5 min, with answers)

1. "How do we know which line is G?" (The treble clef curls around it; it is the second line from the bottom.)
2. "Which note sits in a space, not on a line?" (A.)
3. "Our ladder has a line for every note. Why might the staff use spaces as well?" (Any sensible answer: so more notes fit in a small space; so the lines don't get too crowded.)

✓ Closing check (5 min, with answers)

Children hold answers against their chest: one finger for E, two for G, three for A. Point to a position on the large staff (children who use the raised-line staff feel a counter the teacher places on their own board).

- A note on the second line. (Two fingers: G.)
- A note in the space above the second line. (Three fingers: A.)
- A note on the bottom line. (One finger: E.)

Vocabulary

staff, line, space, treble clef, note head, E, G, A

Differentiation

- **Support:** use only G and E first (two notes, both on lines), then add A; a partner points to the bar while the child reads.
- **Stretch:** play S2 then S3 as an eight-beat tune; write a new four-beat staff tune with E, G and A and swap it with a partner.
- Raised-line staff and bump counters for blind and low-vision children; large print for low-vision children.

⚠ Safety

- Beaters pointed down; instruments on the floor or a table.
- Whiteboard pens: check for scent or allergy concerns; caps on when not in use.

Teacher notes and misconceptions

- Children often count lines from the top. Always count from the bottom, and say "line one" with a finger on the bottom line.
- Some children think a note in a space is "between two notes" and so is half of each. It is its own note, one step above the line below.
- This lesson does not use C and D on the staff (C needs a short extra line below the staff, a ledger line). Children keep using letters for do and re for now.
- The treble clef is shown and named but children do not have to draw it.

Lesson 3: A round in three parts

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 40 minutes.

Goal

Children learn an original round, "Lanterns on the Bridge", by reading its chart, then sing it as a two-part and then a three-part round. They keep their own part going and say how the parts fit together.

Materials

- The hand drum and soft beater; the stop signal.
- The teacher's tuned instrument with C, D, E, G and A.
- Staff card S4 from lesson 2.
- A large chart of the round (below): four numbered lines, each with the words, stick notation and letters, and a tactile copy (felt sticks and staples, raised letters and raised line numbers).
- Three group cards that differ by colour and by shape: red circle, blue square, yellow triangle.
- A conductor's card for each line (1, 2, 3, 4) in large print with raised numbers.
- Ear defenders and a quiet spot.

The round (written for this unit, CC0)

Each line has four beats. Do is C.

Line	Words	Rhythm	Notes
1	Lan-tern, lan-tern, on the bridge	ti-ti ti-ti ti-ti ta	d-d m-m s-s m (C C E E G G E)
2	Shine, shine, shi-ning bright	ta ta ti-ti ta	s s l-l s (G G A A G)
3	Ri-ver run-ning un-der-neath	ti-ti ti-ti ti-ti ta	m-m r-r d-d d (E E D D C C C)
4	Home, home, walk-ing home	ta ta ti-ti ta	d s m-r d (C G E D C)

In a round, group 2 starts line 1 when group 1 starts line 2, and group 3 starts line 1 when group 1 starts line 3. The lines were written so that any lines sung at the same time fit together; using only the five notes helps, but it is not a guarantee for every tune.

Steps

✎ Opening (5 min)

Show staff card S4 from lesson 2 and sing it (G, G, A-A, G). "This tune is hiding in today's song. Can you find it?" Show the round chart. (It is line 2, "Shine, shine, shi-ning bright".)

✎ Main activity (25 min)

1. **Read the round (8 min).** Take one line at a time: the class claps the rhythm from the sticks, says the words in rhythm, then sings the notes from the letters while the teacher plays them. Then sing the whole round together twice, with the teacher's instrument playing along the first time only.
2. **Two parts (7 min).** Split the class into the red circle group and the blue square group. Red starts; blue starts line 1 when red reaches line 2. Each group sings the round twice and stops; the second group finishes a line after the first. A child conductor stands by the chart and points to the line their group is singing.
3. **Three parts (8 min).** Add the yellow triangle group. Each group has its own conductor pointing on the chart. Sing it through twice. If a group gets lost, it stops, listens, and joins again at the start of the next line when its conductor points.
4. **Listen (2 min).** Each group takes a turn to stop singing and listen to the other two for one time through.

✓ Discussion questions (5 min, with answers)

1. "When group 2 starts line 1, what is group 1 singing?" (Line 2.)
2. "When three groups sing, which three lines can you hear at the same time?" (Three lines next to each other in the order of the round: lines 1, 2 and 3; lines 2, 3 and 4; and, when we sing it twice and go back to the start, lines 3, 4 and 1 or lines 4, 1 and 2. At the very start and end there are fewer.)
3. "What helped you keep your own part going?" (Any honest answer: the conductor, covering one ear, watching the chart, singing a bit louder, knowing the words well.)

✓ Closing check (5 min, with answers)

Children hold answers against their chest with fingers (1-4). Point to a line on the chart and say: "Group 1 is singing this line."

- Group 1 is on line 2. "Which line is group 2 singing?" (One finger: line 1.)
- Group 1 is on line 3. "Which line is group 3 singing?" (One finger: line 1.)
- Group 1 is on line 4. "Which line is group 2 singing?" (Three fingers: line 3.)

Vocabulary

round, part, line, conductor, start, together

Differentiation

- **Support:** sing the round in unison until it is secure; join the teacher's group; be a conductor, pointing on the chart instead of singing.
- **Stretch:** play line 4 ("Home, home, walk-ing home") on the teacher's instrument as an ostinato under the round; try it in four parts.
- Children who do not sing can play their group's line on the group instrument, point along, or conduct.

⚠ Safety

- Sing gently; a round tempts groups to sing louder than each other. "Sing so you can still hear the other groups."
- Stop at once if a voice hurts. Ear defenders and the quiet spot are always allowed.

Teacher notes and misconceptions

- Children often think a round is "a race". It is not; everyone keeps the same steady beat. Keep a quiet drum beat going if groups speed up.
- Groups often stop or jump to the other group's line. Sit groups apart, each facing its own conductor.
- Line 4 ends on do, which is why the round sounds finished when the last group stops.
- The note letters C, D, E, G and A suit most voices at this age. If they are too low for the class, start on F instead of C (F, G, A, C, D).

Lesson 4: Question and answer

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 40 minutes.

Goal

Children make up (improvise) four-beat "answers" to four-beat musical "questions", using do, re, mi, so and la and ending on do. They try a calm answer and an excited answer, and say what they did to make it sound that way and where that kind of music might fit.

Materials

- The hand drum and soft beater; the stop signal.
- The teacher's tuned instrument with C, D, E, G and A.
- The five-note ladder card; tune cards A-F from lesson 1 (on the wall).
- Four large question cards Q1-Q4 (below) in stick notation with letters, and tactile copies.
- A "calm" card (a picture of the still river under the bridge at night) and an "excited" card (a picture of the bridge lanterns at a festival), each with a tactile mark (smooth felt for calm, bumpy felt for excited).
- Per group of 3-4: the group instrument (F and B bars off) and two beaters, with letter and tactile stickers.
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

Speak a question and answer to a steady beat: "Where's the lan-tern?" "On the bridge, on the bridge." Then play one on the instrument: question G, E, D, G (so, mi, re, so), answer E, D, D, C (mi, re, re, do). "Does the first part sound finished?" (No.) "Does the second?" (Yes.) "Music can talk like this: a **question** and an **answer**. In our music an answer that ends on do usually sounds finished."

✎ Main activity (25 min)

1. **Echo, then answer (7 min).** Sing or play each question card; the class echoes it. Then the teacher sings the question again and the class sings an answer together, from the ladder: "Walk down to do" (for example mi, re, re, do).
    - Q1: ta ta ta ta; s m r s (G E D G).
    - Q2: ta ta ta ta; d r m s (C D E G).
    - Q3: ti-ti ta ta ta; l-l s m r (A A G E D).
    - Q4: ta ta ta ta; m m s l (E E G A).
2. **Your own answer (10 min).** In groups, one child plays a question card and the next child plays an answer they make up on the spot, four beats, ending on C (do). Then

swap. There are no wrong answers if the answer has four beats and ends on do. Keep a steady beat on the drum or with a quiet "one, two, three, four" so children know when to start.

3. **Calm or excited (8 min).** Hold up the calm card. "Play an answer that sounds calm, like the still river." Then the excited card: "Now an answer that sounds excited, like the lantern festival." Each child plays one of each in their group. Then a few volunteers play one for the class, and the class says which card it was meant to fit.

✓ Discussion questions (5 min, with answers)

1. "What did you do to make an answer sound calm?" (Any reasons such as: played quietly, softly, used steps next to each other, used ta not ti-ti, played slowly, stayed low.)
2. "And excited?" (Any reasons such as: louder, ti-ti, big jumps, high notes, faster.)
3. "Where might people play or sing calm music, and where excited music?" (Any examples: calm for going to sleep, for a quiet time; excited for a party, a game, a festival.)

✓ Closing check (5 min, with answers)

Children close their eyes and show answers against their chest. Children who cannot hear pitch can look at the letters as the teacher points to each one on the ladder card.

- "I will play a question and two answers. Thumb up for the answer that ends on do." Play Q2 (C D E G), then answer 1: E, D, E, G; then answer 2: E, D, D, C. (Answer 2: it ends on do, C.)
- "Is this answer calm or excited? Flat hand for calm, wiggly fingers for excited." Play E, D, D, C slowly and softly. (Calm.)
- Play A-A, G-G, E, C fast and strongly (ti-ti ti-ti ta ta). (Excited.)

Vocabulary

question, answer, improvise, finished, calm, excited, dynamics (loud and quiet), tempo (fast and slow)

Differentiation

- **Support:** give a two-choice answer ("mi, re, do, do" or "so, mi, do, do"); answer on just two notes (re and do); a partner points to the bars.
- **Stretch:** answer with ti-ti in it; make a question as well as the answer; make an answer that copies the first two beats of the question, then ends on do.
- Tactile question cards and bar stickers; a child may point to the bars and a partner plays them.

⚠ Safety

- Excited does not mean as loud as possible. "Strong, not banging."

- Beaters pointed down; instruments on the floor or a table.

Teacher notes and misconceptions

- Improvising feels risky. Model a "plain" answer first (mi, re, re, do), praise effort, and never ask a child to improvise alone in front of the class unless they volunteer.
- Children may think there is a correct answer. There is not; the only rules today are four beats and ending on do.
- "Ending on do sounds finished" is true for most music using these five notes with do as home, but not for all music. "Usually" is the honest word.
- Calm and excited are only two purposes. Others work as well (a tidy-up tune, a tune for a rainy day).

Lesson 5: Our own tunes

Unit overview - Previous: Lesson 4

About 40 minutes.

Goal

Children make up an eight-beat tune (a four-beat question and a four-beat answer), write it down in a way the class agrees on, improve it using a class checklist, and perform it with a partner. As an audience, they listen well and say what they heard and what they think it shows.

Materials

- The hand drum and soft beater; the stop signal.
- The teacher's tuned instrument with C, D, E, G and A.
- The five-note ladder card; tune cards, staff cards and question cards from lessons 1-4 (on the wall).
- Per child: a tune strip with eight boxes (boxes 1-4 for the question, 5-8 for the answer), a pencil and an eraser.
- The lesson 2 staff boards and pens, for children who choose to write E, G and A on the staff.
- The tactile tune kit (felt sticks, staples and rings, raised letters, sticky putty) for children who write by touch.
- Per pair: one group instrument (F and B bars off) and two beaters, with letter and tactile stickers.
- A large class checklist: "Steady beat. We can play it the same way twice. The answer ends on do. It fits what we wanted."
- An "I hear... so I think..." sentence card, large print, with the words also signed or shown with a symbol if the class uses symbols.
- A performance space at the front and chairs for the audience.
- Optional, only if school rules allow: a device to record the instruments only (no faces or names).
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

Play one question and answer from lesson 4. "Today you will make up a tune like that and **write it down**, so that someone else could play it tomorrow." Agree the class's way of writing as a class (2 minutes): for example a stick or staple for the rhythm with a letter under it (as on the tune cards), or, for E, G and A only, notes on the staff. Write the class's agreed way at the top of the board. Children who write by touch use the tactile kit.

✎ Main activity (25 min)

1. **Make it (8 min).** In pairs at one instrument, each child makes up a four-beat question and a four-beat answer that ends on do, and plays it to their partner. They choose whether it should sound calm or excited (or another purpose they choose).
2. **Write it (6 min).** Each child writes their tune on the tune strip, one beat in each box. A child who cannot write yet can stick tactile pieces in the boxes or tell a partner exactly what to write.
3. **Improve it (6 min).** The partner plays the tune from the strip while the composer listens and checks the class checklist. If the partner played something different from what the composer meant, either the playing or the writing needs fixing. The composer makes at least one change, rubs it out and writes it again, and circles the box they changed.
4. **Rehearse (5 min).** Pairs practise playing both tunes, one after the other, starting and stopping together.

Discussion and audience (5 min, with answers)

Before the first pair plays, agree the audience rules together: "Sit still and listen to the end; clap when they finish; say one kind, true thing." Then about four pairs perform (more on another day). After each one, ask two or three listeners: "I hear... so I think..." (for example "I hear lots of ti-ti and high notes, so I think it was meant to be excited"). The performers say whether that is what they meant.

Answers to expect: any sentence that names something heard (a note, rhythm, loud or quiet, fast or slow, ending on do) and links it to an idea.

✓ Closing check (5 min, with answers)

Each child holds up their tune strip and shows the circled box.

- "Show me the box you changed." (A circled box.)
- "Point to the last note of your answer." (A do, a d or C.)
- "Thumb up if your partner played it the way you wrote it." (Thumb up, or a thumb sideways and a plan to fix it.)

Collect the tune strips for the one-to-one check.

Vocabulary

compose, question, answer, notation, improve, rehearse, perform, audience

Differentiation

- **Support:** a tune strip with the rhythm already written (ta in every box) so the child only chooses notes; a four-beat answer only, to the teacher's question card; a partner writes exactly what the child says.
- **Stretch:** a sixteen-beat tune (two questions and two answers); write the parts that use E, G and A on the staff; add a drum ostinato under the tune.

- A child may perform for the teacher only, or conduct while a partner plays their tune.

⚠ Safety

- Keep instruments at a comfortable volume; the audience may use ear defenders.
- If recording, record instruments only, no faces or names, and keep the recording on the school's device.

Teacher notes and misconceptions

- Children often write fewer or more than eight beats. Counting the boxes aloud ("one, two... eight") fixes most of this.
- Some children want to change everything. One change is enough; the aim is to notice what to improve, not to start again.
- "I hear... so I think..." describes first and interprets second. If a child says "it was good", ask "what did you hear that was good?"
- Deaf children can say "I see..." (for example "I see they played the long bars a lot, so I think it was calm and low").

Grade 3 Arts: A Short Play from a Script (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 12 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check props, batteries, the performance space and movement against your school's rules before lesson 1.
>
> Text-checked by four other agents (Gemini 3.8 Flash, Gemini 3.5 Flash, Gemini 4 Argon and Gemini 4 Carbon); see Known gaps.

Back to the grade 3 year plan - Term 3. Builds on kindergarten Acting out a story, a class exhibition and a song share (freeze frames, moving in character), grade 1 A story with stick puppets and a class show (beginning, middle and end; "yes, and"; a class show) and grade 2 A class dance (levels, pathways, performing for another class), and the arts progression

Big idea

A play is a story told by actors in front of an audience. A script is the written plan of a play: it lists the characters, splits the story into scenes, gives each character's spoken lines, and has stage directions that say what the actors do. Actors use voice, face and movement to show who a character is, and a group decides together how to do this. Sets, props, costumes and sound help the audience understand where the story happens and what is going on. A group rehearses, changes things that do not work, and then performs for an audience, who notice the choices the group made.

This is the third arts unit of the grade 3 year (term 1 was choosing colours for a painting, term 2 was reading, singing and making tunes). Children last did drama in grade 1 with stick puppets; this is the first time they act from a written script. The play, The Lost Lamp, is written for this unit and set in Little Hill, the made-up town used in other units: the script is on its own page.

Outcomes

By the end of the unit a student can:

1. Find the parts of a script (title, cast list, scene headings, character names, spoken lines, stage directions) and say what the problem in the play is, how it gets worse and how it is solved (beginning, middle and end).
2. With their group, decide how one character might move and speak, try it, and say why (for example "Goat moves slowly because he is careful").
3. With their group, improvise one new short hunt scene inside given limits (one new place, one character, under a minute), compare ideas and choose one to add to the play.
4. Name one set piece, prop, costume piece or sound their group chose and say what it shows the audience.
5. Rehearse with a group using a class checklist, perform the play (in any role, including non-acting roles) for one other class, and as an audience member say what they saw and why they think the group chose it ("I saw... so I think...").

Prior knowledge

- From kindergarten to grade 2 arts: freeze frames; moving in character; a story with a beginning, middle and end; "yes, and" to add to an idea; levels and pathways; performing for another class and being a good audience.
- From literacy: the letters and patterns taught up to grade 3 term 3. The play's spoken lines use these patterns plus seven word cards (Little Hill, Remy, Duck, Mouse, café, bridge, you) taught in lesson 1.
- New in this unit: a script and its parts; stage directions; scenes; stage left and stage right; props, set, costume and sound as choices; a rehearsal checklist.

Lessons

Each lesson is about 40 minutes: Opening 5, Main activity 25, Discussion 5, Closing check 5. Teach about two lessons a week. Keep the script chart, the word cards and the stage map on the wall for the whole unit.

Lesson	Title	Main activity
1	What is a script?	Learn the word cards, hear the play read aloud, find the parts of a script, read it together and in groups, and find the problem, the middle and the end
2	Voice, face and movement	Warm-ups for body and voice, try ways a character might move and speak, decide as a group, and choose parts (acting or non-acting)
3	A new hunt	Improvise one new hunt scene inside given limits, compare ideas in the group and choose one to add to the play
4	Set, props, costume and sound	Choose a few set pieces, props, costume pieces and a sound from the class box, plan moves on the stage map, and rehearse with the checklist
5	Performing for another class	A last rehearsal, performing for one other class, and responding as an audience ("I saw... so I think...")

Materials (whole class unless noted)

- Every lesson: a hand drum and soft beater for warm-ups; a "stop" signal (a raised hand, or a picture card held up); a quiet spot at the edge of the room with ear defenders; a large-print chart of the script (or the script on a screen); seven large word cards (Little Hill, Remy, Duck, Mouse, café, bridge, you) with a raised-letter copy of each; a large label card for each character (Narrator 1, Narrator 2, Hen, Remy, Goat, Duck, Mouse) with a picture and a raised shape.
- Scripts: per child, a printed copy of the script (large print where needed, with that child's lines highlighted once parts are chosen in lesson 2), a pencil, and a braille or audio copy for children who need one.
- The stage (lessons 2-5): a floor area about 4 metres wide and 3 metres deep marked with stuck-down tape (not loose rope or string), with three places marked inside it: the café (stage left), the bridge (middle back) and the hill (stage right); a blue cloth taped flat for the pond at the front; a row of chairs for the audience. A large stage map card of the same layout, labelled "stage left" and "stage right" from the actors' side, and a raised-line copy.
- Lesson 1: three large cards, "beginning", "middle" and "end", with one, two and three raised dots.
- Lesson 2: per group, a parts list (a strip with the seven characters and the four non-acting roles: sound person, prop manager, prompter, director's helper) and a pencil; a highlighter

for the teacher; a cup for drawing names if two children want the same part; a set of character move cards (pictures, with raised shapes: slow and careful, quick and light, big and loud, small and quiet); a voice card (loud/soft, high/low, fast/slow, with raised arrows).
- Lesson 3: four large place cards (the bakery, the market, the park, the school) with a picture and a raised shape on each; per group, a "new hunt" strip (a long paper strip with three lines to fill in) and a pencil; the limits card ("one new place, one character, under a minute, ends with 'Not in the ...!'"); a sand timer or clock for one minute.
- Lesson 4: a class box of props and costume pieces (per group: one battery lamp with a screwed-shut battery cover, kept by an adult between lessons; one tin with a lid; plastic cups; a tea towel; a few hats, scarves, aprons and headbands with ears, enough for one piece per character); a hand bell or chime bar for the sunset sound; a low table or a hook at child height for the "high peg"; per group, a group plan sheet (set, props, costume, sound, with boxes to tick) and a pencil; the rehearsal checklist chart (we can be heard or seen; we face the audience; we know where to stand; we wait for our cue; we freeze at the end).
- Lesson 5: the lesson 4 props, costumes, bell and stage; the rehearsal checklist; an "I saw... so I think..." sentence card with a raised-line copy; a visiting class (arranged in advance) or a smaller group of visitors.
- One-to-one check (week of lesson 5): a copy of the script; the stage map card and its raised-line copy; the child's group plan sheet; the group's "new hunt" strip.

⚠ Safety and access

Safety (read before lesson 1)

- Space: clear the stage area of bags and furniture; the tape is stuck flat; the pond cloth is taped down so nobody slips. Moving across the stage is walking pace; "running" in the play is acted at walking pace or in slow motion.
- No touching in scenes: characters never hold, push, lift or tickle each other. Stage directions in the script are written so that nobody needs to touch anyone. Passing the lamp is the only hand-to-hand moment, and it can be set down instead.
- Nobody climbs. The "high peg" in the café is a low table or a hook at child height; never a chair, shelf or ladder.
- The lamp is battery-powered, never a flame. Many small lamps use button (coin) batteries, which are very dangerous if swallowed: use lamps whose battery cover is screwed shut, check them before each lesson, and an adult keeps them between lessons.
- Costume pieces: no face paint or masks that cover the nose and mouth; scarves are draped, never tied around the neck; check hats and headbands for latex and wash or keep them per child if head lice are a concern in the school.
- Voices: use a big voice, not a shout. Stop if a voice hurts.
- Recording is optional (lesson 5): only if the school's rules allow it and families agree; never film a child who has said no. Recordings stay on the school's device.

Access and taking part

- **Acting is optional.** Every group also needs a sound person (the bell), a prop manager, a "prompter" who follows the script and helps with lines, and a director's helper who watches from the front. A child who does not want to act chooses one of these roles, and that counts fully. In a group of 6-7 roles can be doubled (one child reads both narrator parts, a narrator rings the bell, an actor is also prop manager), and the teacher can read the narrator parts so that a child who chooses not to act still can.

- **Reading:** nobody has to read aloud alone. Lines are learned by echoing the teacher, reading together, and practising with a partner; a child can keep their script in hand on stage; the prompter can whisper a line. Highlight each child's lines.
- **Children who do not speak, or prefer not to:** sign the lines, use a communication device with the lines stored in it, hold up the word card for their line, or act while a partner or narrator reads the line. Narrators can read from a chair at the side.
- **Deaf and hard-of-hearing children:** the prompter or a partner shows a "your turn" card as a visual cue; face the audience when speaking; agree signs for the character names; the bell can be a visible signal (a raised card) as well as a sound. Check with the child's specialist teacher what helps.
- **Blind and low-vision children:** large-print or braille scripts, or an audio copy; the raised-line stage map; tape with a raised edge at the stage corners and at the three places; the same layout every lesson; a partner says "go now" and where to move (words, not guiding by touch unless the child asks for it).
- **Wheelchair users and children with limited movement:** paths across the stage stay at least 1 metre wide; any character can move by wheeling, with arms, head and face, or stay in one place while the narrator says where they go; their own way of moving counts.
- **Sound-sensitive children:** ear defenders, the quiet spot, a soft chime bar instead of a bell, and the choice of a quiet role.
- **Colour:** the character cards and place cards differ by picture and raised shape as well as colour; no task depends on telling colours apart.
- **Feelings:** talk about how a character might feel ("Remy might feel...") and how actors show it; never ask children about their own feelings or times they lost something. Remy is not "bad": Remy wanted to help and forgot to tell anyone.
- Nobody performs alone. In lesson 5 a child may choose to perform for their own class only, or to do a non-acting role.

Assessment

- Lessons 1-4: the teacher notes answers in the closing checks (observe; no writing needed). Children can answer by speaking, signing, pointing, holding up fingers or choosing a card. Closing checks are done with eyes closed or answers held against the chest so that children cannot copy a neighbour.
- Lesson 5: note each group's performance against the rehearsal checklist (as a group, not each child), and one "I saw... so I think..." response from each child (spoken, signed, pointed to on the sentence card, or said for them and agreed).
- Acting skill, reading aloud and confidence on stage are never assessed; a child in a non-acting role is assessed on the same items.
- **One-to-one check (about 3 minutes per child, during the week of lesson 5):**
    1. Show the script, scene 1. "Point to a line that Hen says. Now point to some words that the actors do not say out loud." (A line after "Hen:"; any stage direction in italics.)
    2. "What is the problem in the play? How does it get solved?" (The big lamp is not in its tin and sunset is soon; Remy took it to dust it bright, and Mouse gets it from the café, so it can be lit on the bridge. Any answer with the missing lamp and finding it is "yes".)
    3. "Show me or tell me how one character in your group moves or speaks, and why." (For example "Goat walks slowly because he is careful"; "Duck has a loud, quick voice

because she is quick." Any way of moving or speaking with a reason linked to the character.)
4. Show the stage map card. "Point to stage left. Where is the café?" (Stage left is the actors' left as they face the audience; the café is there.)
5. Show the group plan sheet. "Name one thing your group chose (a prop, a costume piece, the set or a sound). What does it show the audience?" (For example "the bell shows the sun is going down"; "the apron shows Remy runs the café".)
6. Show the group's "new hunt" strip. "Where did your group's new hunt happen? Why did you choose that idea?" (Names the place and gives any reason, for example "it was funny", "a lamp could be at the market".)

- Record each item as "yes / with help / not yet". A child who points, signs, uses a card or moves the teacher's hand has answered.

Sources

National Core Arts Standards, "Theatre at a Glance", grade 3 column, read from the PDF on 12 November 2026: https://www.nationalartsstandards.org/sites/default/files/2021-11/Theatre%20at%20a%20Glance.pdf

The unit uses these grade 3 performance standards as a guide (quoted exactly as printed; the unit is not a full alignment):

- TH:Cr1.1.3a "Create roles, imagined worlds, and improvised stories in a drama/theatre work." Lesson 3.
- TH:Cr1.1.3b "Imagine and articulate ideas for costumes, props and sets for the environment and characters in a drama/theatre work." Lesson 4.
- TH:Cr1.1.3c "Collaborate to determine how characters might move and speak to support the story and given circumstances in drama/theatre work." Lesson 2.
- TH:Cr2-3a "Participate in methods of investigation to devise original ideas for a drama/theatre work." Lesson 3. (The PDF prints this code as "TH:Cr2-3.")
- TH:Cr2-3b "Compare ideas with peers and make selections that will enhance and deepen group drama/theatre work." Lesson 3.
- TH:Cr3.1.3a "Collaborate with peers to revise, refine, and adapt ideas to fit the given parameters of a drama theatre work." Lessons 3 and 4. (Printed without a slash between "drama" and "theatre".)
- TH:Cr3.1.3b "Participate and contribute to physical and vocal exploration in an improvised or scripted drama/theatre work." Lesson 2.
- TH:Cr3.1.3c "Practice and refine design and technical choices to support a devised or scripted drama/theatre work." Lesson 4.
- TH:Pr4.1.3a "Apply the elements of dramatic structure to a story and create a drama/theatre work." Lessons 1 and 3.
- TH:Pr4.1.3b "Investigate how movement and voice are incorporated into drama/theatre work." Lesson 2.
- TH:Pr5.1.3a "Participate in a variety of physical, vocal, and cognitive exercises that can be used in a group setting for drama/theatre work." Opening warm-ups in every lesson.
- TH:Pr5.1.3b "Identify the basic technical elements that can be used in drama/theatre work." Lesson 4.
- TH:Pr6.1.3a "Practice drama/theatre work and share reflections individually and in small groups." Lessons 4 and 5.
- TH:Re7.1.3a "Understand why artistic choices are made in a drama/theatre work." Lesson 5.

- TH:Re9.1.3a "Understand how and why groups evaluate drama/theatre work." Lesson 4 (the rehearsal checklist).
- TH:Re9.1.3c "Evaluate and analyze problems and situations in a drama/theatre work from an audience perspective." Lesson 5.
- TH:Cn11.1.3a "Identify connections to community, social issues and other content areas in drama/theatre work." Lesson 1, partly (Lamp Night as a town event in Little Hill, and the town council from the grade 3 society unit).

Read for this unit (Wikipedia, 12 November 2026):

- "Table read": https://en.wikipedia.org/wiki/Table_read Used for: a read-through (table read) is an organised reading of the script by the actors with speaking parts, usually the first time everyone in the production gathers. Lesson 1.
- "Blocking (stage)": https://en.wikipedia.org/wiki/Blocking_(stage) Used for: blocking is the precise arrangement of actors in a play; in English-speaking cultures, stage left and stage right are the actors' left and right when facing the audience. Lesson 4.
- "Improvisational theatre": https://en.wikipedia.org/wiki/Improvisational_theatre Used for: in improvisation, what is performed is unplanned or unscripted and made up by the performers; improvisation is often used in drama programmes to train actors. Lesson 3.

The play The Lost Lamp, the word cards, character cards, place cards, checklists and all other materials are written for this unit (CC0). The lesson sequence and checks are the author's own example, not from a source.

Known gaps and cautions

- Three other agents (Gemini 3.8 Flash, Gemini 3.5 Flash and Gemini 4 Argon, at 3225920) text-checked this unit on 12 November 2026 and reported no errors. Gemini 4 Carbon also text-checked it on 12 November 2026 and reported one taught-pattern slip ("rubbed" in the script, now "dusted") and two small materials and reading notes, all fixed in d44a610. Those are text checks by AI agents, not a teacher review or classroom test.
- TH:Re8.1.3a-c (personal experiences, cultural perspectives in character design, connecting oneself to a character's emotions), TH:Re9.1.3b (technical elements across several works), TH:Cn10.1.3a (personal experiences and community) and TH:Cn11.2.3a-b (adapting stories from literature; the same story in different art forms) are not covered. Re8.1.3c is left out on purpose: the unit talks about characters' feelings, not children's own. A teacher could add Cn11.2.3a by comparing the play with a written story version.
- The script uses seven word cards that are not decodable with the patterns taught so far in these drafts (Little Hill, Remy, Duck, Mouse, café, bridge, you). Stage directions are not decodable and are read by the teacher. Real grade 3 readers will usually read more than this; teachers can add lines.
- The play has seven parts. For groups of five or six, one child reads both narrator parts, or the teacher narrates; for groups of eight, add a sound person or prompter. Every group performs the same play, so the visiting class sees it several times; lesson 5 suggests ways to keep this short.
- The stage size, the "stage left" layout and the choice of props are the author's choices. A drama teacher will know more about warm-ups, rehearsal and staging; change them to suit the room.
- Timings are untested. Lesson 4 (choosing props and rehearsing) and lesson 5 (rehearsal, performance and response) are the most likely to run over; the performance can move to another day.

Lesson 1: What is a script?

Unit overview - Next: Lesson 2

About 40 minutes.

Goal

Children learn the seven word cards, hear the play The Lost Lamp read aloud, find the parts of a script (title, cast list, scene headings, character names, spoken lines, stage directions), read the play together, and say what the problem is, how it gets worse and how it is solved.

Materials

- The hand drum and soft beater; the stop signal; ear defenders and a quiet spot.
- The large-print chart of the script (or the script on a screen).
- The seven large word cards (Little Hill, Remy, Duck, Mouse, café, bridge, you) and their raised-letter copies.
- The seven character label cards (Narrator 1, Narrator 2, Hen, Remy, Goat, Duck, Mouse) with pictures and raised shapes.
- Per child: a printed copy of the script (large print, braille or an audio copy where needed) and a pencil.
- For children who need support: a copy with one character's lines highlighted (a highlighter).
- Three large cards: "beginning", "middle" and "end", each with a raised shape (one dot, two dots, three dots).

Steps

✎ Opening (5 min)

Warm-up circle (sitting or standing). Pass a "clap" round the circle, then a "wave", then a "smile": each child does it and the next child copies. Anyone may pass with a nod. Then the teacher says "Good day!" in three ways (quietly, loudly, slowly) and the class echoes each one. "Today we meet a play. A play is a story that actors show to an audience."

✎ Main activity (25 min)

1. **Word cards (5 min).** Show the seven word cards one by one. Say each word; the class echoes it; then the class reads it without help. "These are names and words from our play. Some of them have letters we have not learned yet, so we learn them as whole words." Put them on the wall next to the script chart.
2. **Hear the play (5 min).** Read the whole play aloud from the chart, with a different voice for each character, and read the stage directions in a plain voice. Children follow on their own copy if they like.
3. **Parts of a script (5 min).** Point to each part on the chart and give its name: the **title**; the **cast** list (the characters); **scene** headings (where we are); the character's **name** in bold before each **line**; **stage directions** in italics ("these tell the actors what to do;

nobody says them out loud"). Children find each one on their own copy and put a pencil tick next to one stage direction.

4. **Read it together (6 min).** Read scene 1 as an echo: the teacher reads a line, the class echoes it. Then the class reads scene 2 together (choral reading), with the teacher reading stage directions. Then split the room into seven sections, one per character card, and read scene 3 with each section reading its character's lines together. Nobody reads alone.
5. **Problem and ending (4 min).** Hold up the "beginning", "middle" and "end" cards. "At the beginning, what is the problem?" (The big lamp is not in its tin, and Lamp Night is tonight.) "In the middle, what makes it worse?" (They look on the hill, in the pond and in a cup and do not find it; the sun goes low and sunset is soon.) "How does it end?" (Remy took the lamp to dust it bright; Mouse gets it from the café; the lamp is lit on the bridge.)

✓ Discussion questions (5 min)

- "Lamp Night is a night when the whole town of Little Hill comes together. Who is in charge of it?" (Hen, the mayor. In the grade 3 society unit Mayor Hen also leads the town council.)
- "Why did Remy take the lamp?" (To dust it and make it bright; Remy wanted to help.) "What could Remy do next time?" (Tell someone: "Remy, tell us if you take the lamp.")
- "How might Hen feel when the tin is empty?" (Possible answers: worried, surprised, cross. Any feeling with a reason from the play.) Keep the talk about the characters.

✓ Closing check (5 min)

Children close their eyes (or hold answers against their chest).

1. "Hold up one finger if the words in italics are spoken, two if they are not." (Two: they are stage directions.)
2. "Point to the word card that says the name of the person who runs the café." (Remy.)
3. "Hold up one, two or three fingers: in which part of the play is the lamp found: beginning (1), middle (2) or end (3)?" (2 or 3 are both reasonable: Mouse gets it at the end of the middle scene, and it is lit in scene 3. Ask children who show 2 or 3 to say why.)

Vocabulary

play, script, title, cast, character, scene, line, stage direction, narrator, audience, problem, beginning, middle, end

Differentiation

- **Support:** a script with only one character's lines highlighted; word cards on the child's desk; read with a partner. A child who cannot yet read the lines learns them by echoing and joins the choral reading.
- **Stretch:** find the three places the play happens (the café, the hunt around Little Hill, the bridge) and draw a quick map of them; or find a line that shows Goat is careful or slow.

- **Tactile:** raised-letter word cards; braille or raised-shape cues for character names on the script; the beginning/middle/end cards have one, two and three raised dots.

⚠ Safety

Seated activity. Keep the room calm; children who find choral reading loud can wear ear defenders or follow silently.

Teacher notes and misconceptions

- Some children read stage directions aloud as if they were lines. Use a plain "teacher voice" for them and point to the italics each time.
- "Narrator" is new to some children: a narrator talks to the audience and is not one of the animals in the story.
- Do not choose parts yet; children try all of them first (lesson 2).
- Remy has no "he" or "she" in this unit; use "Remy" each time.

Lesson 2: Voice, face and movement

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 40 minutes.

Goal

Children warm up their bodies and voices, try different ways a character might move and speak, decide as a group how their characters will move and speak and why, and choose parts (acting or non-acting).

Materials

- The hand drum and soft beater; the stop signal; ear defenders and a quiet spot.
- The stage marked with stuck-down tape (café stage left, bridge middle back, hill stage right, the blue pond cloth taped flat at the front); the stage map card and its raised-line copy.
- The script chart; the seven word cards; the seven character label cards.
- The character move cards (slow and careful, quick and light, big and loud, small and quiet) with raised shapes; the voice card (loud/soft, high/low, fast/slow) with raised arrows.
- Per child: their script and a pencil (and a highlighter for the teacher to mark each child's lines after parts are chosen).
- Per group of 6-7: a parts list (a strip with the seven characters and the four non-acting roles: sound person, prop manager, prompter, director's helper) and a pencil; a cup for drawing names if two children want the same part.

Steps

✎ Opening (5 min)

Warm-up in a space each, on or around the stage. Shake out hands, then arms, then shoulders (any part a child can move). Stretch tall, then curl small. Voice: hum quietly, then say "Hot buns!" softly, then in a big voice (not a shout), then slowly, then fast. On the drum beat, freeze; on two beats, relax. "Actors warm up so their bodies and voices are ready."

✎ Main activity (25 min)

1. **Try the moves (7 min).** Show each move card. On the drum beat the class moves around the room that way, then freezes: slow and careful; quick and light; big and loud (a big body shape, still walking pace); small and quiet. Then call a character: "Move like Goat might move." "Move like Mouse." Children choose their own way; there is no right answer. Moving in any way, including only arms, head and face, counts.
2. **Try the voices (5 min).** Everyone says Duck's line "Not the lamp!" loud, then soft, then high, then low, then fast, then slow. "Which way fits Duck? Why?" Then try Goat's "But sunset is soon!" in two different ways and talk about which fits.

3. **Decide as a group (7 min).** In groups of 6-7, children read scene 1 once (each child reads one character's lines; swap after each line if they like). Then for each character the group agrees one way of moving and one way of speaking, using the cards, and says why ("Duck talks fast and loud because she is quick and loud"). The teacher visits each group and asks "why?" for one character.
4. **Choose parts (6 min).** Each group fills in its parts list. Every child writes or points to two choices: a first choice and a second choice, including the non-acting roles. If two children want the same part, they try it once each and the group decides, or they draw names from a cup; whoever does not get it gets their second choice. Every speaking part must be covered: one child can read both narrator parts, a narrator can also ring the bell, and an actor can also be prop manager. If a group has more children choosing non-acting roles than it can spare, the teacher reads the narrator parts for that group. The teacher checks that every child has a role and highlights each child's lines on their script after the lesson.

✓ Discussion questions (5 min)

- "How did your group decide how Goat moves?" (Answers vary; any reason from the play, for example "he is careful" or "he walks slowly up the hill".)
- "Why might two groups make Hen move in different ways?" (Each group makes its own choices; there is more than one good way.)
- "Why does a sound person or a prompter matter?" (The sunset bell shows the sun going down; the prompter helps when someone forgets a line.)

✓ Closing check (5 min)

Children close their eyes (or hold answers against their chest).

1. "Hold up one finger for a loud voice, two for a soft voice: which would you use for Duck's 'Not the lamp!' in your group?" (Either; then ask two children why. Any reason from the play counts.)
2. "Point to the move card your group chose for Goat." (Any card, with a reason given when asked.)
3. "Show me your part on your parts list." (Every child points to a role; any role is correct.)

Vocabulary

warm-up, voice, movement, character, freeze, loud, soft, high, low, fast, slow, prompter, sound person, prop manager, director's helper

Differentiation

- **Support:** a child chooses from two move cards rather than four; a partner moves alongside (without touching); the prompter role suits children who like to read but not perform.
- **Stretch:** add one face (expression) for their character at one moment, for example how Hen's face changes when she opens the tin.
- **Tactile:** raised shapes on the move cards; raised arrows on the voice card; the raised-line stage map to find the café, bridge and hill.

⚠ Safety

Clear the space first. Moving is walking pace; freeze on the drum. No touching: children keep a space bubble around them. Big voice, not a shout. Children who want a break go to the quiet spot.

Teacher notes and misconceptions

- Children may think there is one "right" Goat. Praise different choices that have reasons.
- Some children will want the biggest part. Remind the class that the play needs every role, and that roles can be swapped for a second performance if time allows.
- A child who chooses a non-acting role still joins the warm-ups and the group decisions.

Lesson 3: A new hunt

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 40 minutes.

Goal

Children improvise (make up without a script) a new short hunt for scene 2 inside given limits, try more than one idea, compare the ideas as a group, and choose one to add to their play.

Materials

- The hand drum and soft beater; the stop signal; ear defenders and a quiet spot.
- The stage (stuck-down tape, the taped pond cloth) and the stage map card with its raised-line copy.
- The script chart, open at scene 2; each child's script.
- The four place cards (the bakery, the market, the park, the school) with pictures and raised shapes.
- The limits card: "one new place, one character, under a minute, ends with 'Not in the ...!'" (large print, with a raised-shape copy).
- A sand timer or clock for one minute.
- Per group of 6-7: a "new hunt" strip (three lines: "Narrator: ...", "what the character does", "Character: Not in the ...!") and a pencil.

Steps

✎ Opening (5 min)

Warm-up: "Yes, and" in a circle. The teacher starts: "I found a hat." The next child says "Yes, and..." and adds one thing ("Yes, and it was on a goat"). Go round once; anyone may pass. Then a quick voice warm-up: the class says "Not in the pond!" surprised, then tired, then giggly.

✎ Main activity (25 min)

1. **What is improvising? (3 min).** "Improvising means making up what you say and do as you go, without a script. Actors often improvise to find new ideas. Then they choose the best ideas and write them down." Read the limits card together.
2. **Model one (3 min).** The teacher and two volunteers improvise an example at the stage, using a place that is not on the cards (for example, the post office): Narrator: "Hen looks at the post office." Hen looks in a pretend letter box and a pretend parcel, then says "Not in the post office!" "That was under a minute, one place, one character, and it ended with 'Not in the...!' It fits the limits."
3. **Try ideas (9 min).** Each group gets the four place cards. The teacher reads the four place names aloud with the group first (these words use letters and patterns not yet taught). The group chooses two of them. For each, the group improvises a hunt: who

looks (any one character), what they do there, and their "Not in the...!" line. Each group tries at least two different ideas, using the timer to keep each under a minute. Every child suggests or tries something, or says "yes, and" to someone else's idea.
4. **Compare and choose (6 min).** Each group shows its two ideas to itself again quickly, then talks: "Which idea is funnier, clearer or more surprising? Which fits our character?" The group votes with a thumb or a pointed finger, or agrees by talking; the director's helper counts. The chosen hunt is written on the "new hunt" strip by a group member or the teacher, using the children's words.
5. **Fit it in (4 min).** The group reads scene 2 with the new hunt added after "Mouse looks in a cup." and checks that the scene still ends with "Not in my cup!" and the sunset bell. If the new hunt makes the scene too long, they cut one action (adapting to the limits).

✓ Discussion questions (5 min)

- "How did your group choose between your two ideas?" (Answers vary, for example "we voted", "it was funnier", "it fitted Duck".)
- "Why does the play need limits like 'under a minute'?" (So the play does not get too long; the audience still wants to know where the lamp is; every group can fit its idea in.)
- "Did someone's idea get better when another person said 'yes, and'?" (Answers vary; praise examples where ideas were built on.)

✓ Closing check (5 min)

Children close their eyes (or hold answers against their chest).

1. "Hold up one finger if improvising means reading from a script, two if it means making it up as you go." (Two.)
2. "Point to the place card your group chose." (Any card; check it matches the group's strip.)
3. "Hold up fingers for how many characters look in the new place." (One, by the limits card.)

Vocabulary

improvise, idea, limits, compare, choose, "yes, and", adapt

Differentiation

- **Support:** a child contributes by choosing a place card or acting a search without words; sentence starters on the strip ("Goat looks in the..."); the teacher scribes.
- **Stretch:** add a funny detail that fits the character (Mouse finds a crumb at the bakery and says "Not the lamp, but yum!") while keeping to the limits.
- **Tactile:** raised shapes on the place cards and limits card; the raised-line stage map to choose where the new place is on the stage.

⚠ Safety

Moving is walking pace; no touching; pretend objects stay pretend (no climbing on furniture to "look high"). Keep the improvisation about the lamp hunt in Little Hill, not about children's own homes or belongings.

Teacher notes and misconceptions

- Children may try to add several new places. The limits card says one; that is part of the task (fitting an idea to given limits).
- Some children feel a new idea must be "right". Improvising has no wrong idea; the group chooses which idea to keep.
- If a group cannot agree, they may keep the first idea they all tried and save the other for "next time".

Lesson 4: Set, props, costume and sound

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 40 minutes.

Goal

Children name the basic technical parts of a play (set, props, costume and sound), choose a few for their group and say what each shows the audience, plan where they stand and move on the stage (stage left and stage right), and rehearse using a class checklist.

Materials

- The hand drum and soft beater; the stop signal; ear defenders and a quiet spot.
- The stage (stuck-down tape, the taped pond cloth, the café, bridge and hill marked); the stage map card and its raised-line copy.
- The class box of props and costume pieces: per group, one battery lamp with a screwed-shut battery cover (checked by an adult before the lesson), one tin with a lid, plastic cups and a tea towel; a few hats, scarves, aprons and headbands with ears, enough for one piece per character.
- A low table or a hook at child height in the café (the "high peg").
- A hand bell or a soft chime bar for the sunset sound.
- Per group: a group plan sheet (four boxes: set, props, costume, sound) and a pencil; the group's "new hunt" strip from lesson 3.
- The rehearsal checklist chart: we can be heard or seen; we face the audience; we know where to stand; we wait for our cue; we freeze at the end.
- Each child's script (highlighted).
- A row of audience chairs (with space for wheelchairs).

Steps

✎ Opening (5 min)

Warm-up: "Stage left, stage right." Children stand on the stage facing the audience chairs. "Stage left is your left when you face the audience." The teacher calls "stage left!", "stage right!", "middle!", "freeze!" and children move there at walking pace (or point, or wheel). Then ask: "If you sat on the audience chairs, would stage left be on your left?" (No: it is the actors' left, so for the audience it is on the right.)

✎ Main activity (25 min)

1. **Name the parts (4 min).** Hold up examples. **Set:** what makes the place (the café table, the pond cloth, the bridge tape). **Props:** things actors hold or use (the lamp, the tin, a cup). **Costume:** what actors wear to show the character (an apron, a hat, ears). **Sound:** noises that help the story (the sunset bell). "Each one helps the audience understand where we are and who is who."

2. **Choose and say why (7 min).** Each group's prop manager collects the group's lamp, tin and cups. Each actor chooses at most one costume piece, or none, and says what it shows ("the apron shows Remy runs the café"). The group fills in its plan sheet: one thing in each box, and a few words or a picture about what it shows. Nobody has to wear a costume piece.
3. **Plan the moves (6 min).** Using the stage map card, the group agrees where each character starts in scene 1 (near the café), where Goat, Duck and Mouse go in scene 2 (hill, pond, café), where their new hunt happens, and where everyone ends in scene 3 (the bridge). The director's helper or the teacher marks starting places on the map with the group's initials. Check: does any move need two people to cross close together? If so, change it so everyone has space.
4. **Rehearse (8 min).** Each group rehearses the whole play once with props and sound in its own space; while they do, the teacher gives each group a short turn on the marked stage to run one scene. Then the group reads the checklist: for each line, they agree "yes" or "not yet" and change one thing (for example "Duck turns to face the audience" or "the bell rings before 'The sun dips low.'"). If time allows, run the changed part once more.

✓ Discussion questions (5 min)

- "What does the bell tell the audience?" (The sun is going down; time is running out; sunset is soon.)
- "Why does a group check its work with a checklist?" (To find what to make better; so everyone agrees what "good" means; so the audience can see and hear the story.)
- "Which change made the biggest difference in your rehearsal?" (Answers vary.)

✓ Closing check (5 min)

Children close their eyes (or hold answers against their chest).

1. "I say a thing; hold up one finger for a prop, two for a costume piece, three for a sound. The lamp." (One.) "An apron." (Two.) "The bell." (Three.)
2. "Point to stage left." (Their own left as they face the audience chairs.)
3. "Hold up one finger if your group changed something after the checklist, two if not yet." (Note any group showing two and visit it at the start of lesson 5.)

Vocabulary

set, prop, costume, sound, stage left, stage right, rehearse, checklist, cue, prop manager

Differentiation

- **Support:** a child chooses between two costume pieces; the plan sheet has pictures to circle; a partner points to the stage map with them.
- **Stretch:** suggest a second sound (for example a soft splash for the pond made with a hand on the drum) and say what it adds; or explain the stage left/audience left difference to a partner.

- **Tactile:** raised-line stage map with initials in raised letters or shapes; real props to handle before choosing; the bell can be felt through the table as well as heard.

⚠ Safety

- Check every lamp's battery cover is screwed shut before the lesson; lamps go back to the adult after the lesson.
- No climbing: the "high peg" is at child height.
- Scarves are draped, never tied around the neck; no face paint or masks that cover the nose and mouth.
- No touching in scenes; plan moves so actors do not crowd each other.
- The bell or chime bar is rung gently; sound-sensitive children may use ear defenders or ring it themselves.

Teacher notes and misconceptions

- "Stage left" confuses many adults too. Always say "your left as you face the audience".
- Children may want lots of props. Fewer props are easier to manage and the audience can still follow the story; the plan sheet asks for one per box.
- Groups rehearse in their own spaces while one group uses the marked stage; rotate so each group has the stage for a short run.

Lesson 5: Performing for another class

Unit overview - Previous: Lesson 4

About 40 minutes.

Goal

Groups do a last quick check, perform The Lost Lamp (with their own new hunt) for one other class, and respond as an audience: say what they saw, why they think the group chose it, and what the problem in the play was from the audience's side. Groups then share one reflection about their own performance.

Materials

- The hand drum and soft beater; the stop signal; ear defenders and a quiet spot.
- The stage (stuck-down tape, the taped pond cloth, café, bridge and hill marked) and a row of audience chairs (with space for wheelchairs).
- Each group's props (battery lamp with a screwed-shut battery cover, checked by an adult, tin, cups, tea towel), costume pieces, the bell or chime bar, the plan sheet and the "new hunt" strip.
- Each child's script (actors may hold it on stage).
- The rehearsal checklist chart.
- The "I saw... so I think..." sentence card and its raised-line copy.
- A visiting class, arranged in advance, or a smaller group of visitors.

Steps

✎ Opening (5 min)

Before the visitors arrive. A quick warm-up: shake out, stretch, hum, then the whole class says "Hooray!" softly and then in a big voice (not a shout). Each group reads the checklist once and reminds itself of the one thing it changed in lesson 4. Prop managers check their props are ready at the side of the stage.

✎ Main activity (25 min)

1. **Welcome the audience (2 min).** A child or the teacher welcomes the visitors: "Our play is The Lost Lamp. Each group added its own new hunt. Please watch quietly, and clap at the end." Remind everyone of audience manners: eyes on the stage, quiet hands, clap at the end.
2. **Performances (16 min).** Each group performs in turn (about 3 minutes each). Between groups, the next prop manager sets out the tin and lamp while the audience stretches in their seats. Groups waiting to perform sit in the audience. If time is short, two groups perform today and the others perform on another day (for the same visitors or for their own class); the play is short, so a visiting class may prefer two performances to four.

3. **Audience responses (7 min).** After the performances, the visitors and the class (as audience) share responses using the sentence card: "I saw... so I think..." about one choice (for example "I saw Duck flapping fast, so I think she was worried"; "I heard the bell, so I think the sun was going down"). Then ask the audience: "What was the problem in the play? When did you know it was going to be all right?" (The lamp was missing and sunset was soon; when Remy said where it was, or when Mouse came back with it.) Take a few answers from both classes. Thank the visitors.

✓ Discussion questions (5 min)

After the visitors leave, in groups:

- "What went well in our performance?" (Answers vary; link to the checklist.)
- "What is one thing we would change if we performed again?" (Answers vary, for example "speak more slowly", "face the audience".)
- "Why did the audience notice our new hunt?" (Answers vary; for example it was new, it was funny, it fitted the character.)

Each group shares one reflection with the class (the director's helper or any child, by speaking, signing or pointing to the checklist).

✓ Closing check (5 min)

Children close their eyes (or hold answers against their chest).

1. "Hold up one finger if an audience should talk during the play, two if it should watch quietly and clap at the end." (Two.)
2. "Think of one choice another group made. Tell your partner: 'I saw... so I think...'" (Listen to a few pairs; any choice with a reason.)
3. "Hold up one, two or three fingers: how many groups did you watch today?" (The number of groups that performed, apart from their own.)

Vocabulary

perform, audience, clap, response, choice, reflection, "I saw... so I think..."

Differentiation

- **Support:** a child points to the sentence card and a partner says the start; a child can answer about the bell or a prop (things that are easy to see).
- **Stretch:** say why a different group made a different choice for the same character (for example two different Goats).
- **Tactile:** raised-line sentence card; the child can hold the props from another group (with permission) to describe what they noticed.

⚠ Safety

- Check every lamp's battery cover is screwed shut; lamps go back to the adult afterwards.
- Keep the stage clear between performances; walking pace on and off; no touching in scenes; no climbing.
- Audience chairs leave clear paths to the door and wheelchair spaces.
- Recording only if the school's rules allow it and families agree; never film a child who has said no.

Teacher notes and misconceptions

- Nerves are normal. Actors may keep their scripts in hand; the prompter helps with lines; a child may switch to a non-acting role on the day.
- Audience responses are about the play and the choices, not about a child ("I saw Goat walk slowly", not "Sam was bad").
- If the visiting class is younger, keep responses short and let them show with thumbs or by pointing to a prop.
- The one-to-one check (see the unit overview) is done during this week.

The Lost Lamp: a short play for grade 3

Unit overview

An original play written for this unit (CC0). It is set in Little Hill, the made-up town used in other units. It takes about 3 minutes to perform.

Words in italics are **stage directions**: they tell the actors what to do and are not spoken. Children read the spoken lines only; the teacher reads the stage directions aloud until the group knows them.

Word cards to learn first (lesson 1): Little Hill, Remy, Duck, Mouse, café, bridge, you. The other spoken words use letters and patterns taught in the literacy units up to grade 3, plus the tricky words "the", "I", "is", "my", "to", "was", "come" and "one".

Cast (7 parts)

- **Narrator 1** and **Narrator 2**: tell the audience where we are and what happens. One child can read both narrator parts.
- **Hen**: the mayor of Little Hill (she). In charge of Lamp Night.
- **Remy**: runs the café. Kind and busy.
- **Goat** (he): slow and careful.
- **Duck** (she): quick and loud.
- **Mouse** (she): small and quick.

Scene 1: At Remy's café, before sunset

The café is on one side of the stage. A tin sits by the café step. Remy is setting out cups. Hen, Goat, Duck and Mouse come in.

Narrator 1: It is Lamp Night in Little Hill.

Narrator 2: At sunset, the big lamp is lit on the bridge.

Remy: Hot buns! Hot milk! Come in, come in!

Hen: Good day, Remy! Is the big lamp in its tin?

Remy: It is in the tin at the step.

Hen opens the tin. Everyone looks in. The tin is empty.

Hen: The lamp is not in the tin!

Duck: Not the lamp!

Goat: But sunset is soon!

Hen: Let us hunt! Look high and low!

Everyone freezes for a moment, then sets off.

Scene 2: The hunt

Narrator 1: Goat runs up the hill.

Goat moves slowly to the hill side of the stage and looks around.

Narrator 2: Duck swims in the pond.

Duck goes to the pond (the blue cloth) and splashes about, without touching anyone.

Narrator 1: Mouse looks in a cup.

Mouse peers into a cup at the café.

(In lesson 3 each group may add one more hunt here: a narrator line, a character looking somewhere new, and "Not in the ...!")

Goat: Not on the hill!

Duck: Not in the pond! I am wet!

Mouse: Not in my cup!

The sound person rings the bell once, slowly.

Narrator 2: The sun dips low.

Goat: Sunset is soon!

Hen: Remy, did you see the lamp?

Remy looks down at the floor for a moment.

Remy: I took it. It was dull. I dusted it to make it bright.

Hen: Remy! Is it in the café?

Remy: It is on a high peg in the café.

Mouse: I can get it!

Mouse goes into the café, reaches up (the lamp is on a low table or a hook within easy reach; nobody climbs) and comes back holding the lamp.

Mouse: Got it! It is bright!

Scene 3: On the bridge, at sunset

Everyone moves to the bridge in the middle of the stage. Hen sets the lamp down and switches it on.

Narrator 1: At sunset, the lamp is lit.

Narrator 2: It glows on the bridge.

Hen: Remy, tell us if you take the lamp.

Remy: I will! Hot buns! Come and get one!

Goat: Good lamp. Good buns. Good Lamp Night.

All: Hooray!

Everyone freezes in a still picture around the lamp. The end.

Grade 4 Arts (Music): Patterns That Repeat — Ostinatos, Rounds and Song Form (5 lessons, about 2-3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 5 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules.

Back to the arts progression

Big idea

Music is built from patterns that repeat and patterns that change. A short pattern repeated over and over (an ostinato) can hold a piece together; the same tune started at different times (a round) can fit with itself; and most songs are made of sections, such as verses and a chorus, that we can hear, name with letters and use in our own pieces.

Outcomes

By the end of the unit, students can:

- keep a steady pulse and clap, read and write a 4-beat rhythm using crotchets/quarter notes, quaver/eighth-note pairs, crotchet/quarter rests, minims/half notes and groups of four semiquavers/sixteenth notes;
- perform a rhythmic ostinato steadily while others perform something different;
- explain the difference between singing in unison and singing a round, and sing a simple round in at least two parts;
- listen to a song and label its sections (for example verse and chorus, or A A A) and say what changes and what stays the same;
- with a group, compose and perform a short piece that has a 4-bar rhythm ostinato and a clear structure (for example A B A or verse-chorus-verse-chorus), and give one specific, kind piece of feedback to another group.

Prior knowledge

- From grade 3 arts (see the progression): steady beat, simple rounds and a first look at staff notation. Classes that skipped this can still start here; lesson 1 rebuilds pulse and rhythm from scratch.
- Grade 3 colour mixing is visual art, not music, but its "I notice you used ___ and it makes ___" feedback sentence is reused in lesson 5.

Lessons

1. Pulse, rhythm and our first ostinato
2. Unison and layers: one song, two parts
3. Rounds: one tune that fits with itself
4. Song form: verses, choruses and letters
5. Compose, perform and respond

Materials

- A space where the class can stand in a circle; a board.
- Untuned percussion if available (drums, shakers, claves, woodblocks). Body percussion (clap, pat knees, stamp, click) works for every activity if there are no instruments.
- A way to play recordings (for lessons 2 and 4) and, ideally, a way to record the class (for lesson 5).
- Printed rhythm cards (lesson 1) and a song-map sheet (lesson 4).
- Songs: use traditional songs your class knows and that are out of copyright where you are. The examples in this unit are traditional rounds ("Row, Row, Row Your Boat", "Frère Jacques", "Three Blind Mice") and strophic songs. Choose local songs, songs in pupils' home languages, and songs from more than one tradition where you can.

Assessment

- Ongoing: watch and listen for a steady pulse in every lesson; note pupils who drift and pair them with a steady partner.
- Each lesson ends with a short closing check with example answers.
- Lesson 5: group performance with a simple checklist (ostinato steady? clear structure? everyone had a part?) plus an 8-question end check. No pass mark is suggested; use the results to plan the next unit.

⚠ Safety

- **Volume and ears.** Keep percussion at a level where you can still talk over it. Agree a stop signal (for example a raised hand: everyone freezes) before any instrument is handed out. Never play loudly near someone's ear.
- **Instruments.** Check beaters and shakers for loose parts. Wipe shared mouth-blown instruments according to school hygiene rules (this unit does not require any).
- **Movement.** Stamping and stepping need space and non-slip floors; seated versions are given for every movement activity.
- **Voices.** Singing should never hurt. Keep songs in a comfortable middle range and stop anyone who is straining or shouting.

Sources

Facts about musical forms and history in this unit come from these Wikipedia articles (read on 5 November 2026):

- Ostinato: https://en.wikipedia.org/wiki/Ostinato
- Round (music): https://en.wikipedia.org/wiki/Round_(music)
- Canon (music): https://en.wikipedia.org/wiki/Canon_(music)
- Unison: https://en.wikipedia.org/wiki/Unison
- Kodály method (read on 6 November 2026; source for quarter and eighth notes being the first rhythm values usually taught, and for "ta", "ti-ti" and sixteenth-note syllables varying between countries): https://en.wikipedia.org/wiki/Kod%C3%A1ly_method
- Strophic form: https://en.wikipedia.org/wiki/Strophic_form
- Verse–chorus form: https://en.wikipedia.org/wiki/Verse%E2%80%93chorus_form
- Song structure: https://en.wikipedia.org/wiki/Song_structure

The British and American rhythm names ("crotchet/quarter note" and so on) and the "ta-a" half-note syllable in lesson 1 are common classroom practice, not taken from these sources; use whatever names your school already uses.

Known gaps and cautions

- **Encyclopedia sources only, and no educator review.** A music teacher should check the pacing, the notation and the song choices.
- **Western notation and form labels.** Crotchets, bars and letter labels (A, B) come from European traditions. Many musical traditions are taught by ear and have their own ways of describing structure; say so to the class and, where possible, invite a local musician.
- **Song choice and copyright.** Do not hand out printed lyrics or recordings of copyrighted songs unless your school's licence allows it. Listening to a recording in class is different from copying it; check local rules.
- **Pupils who find group music hard.** Some pupils find loud, layered sound overwhelming. Offer a quiet role (conductor, recorder, "listener who reports back"), allow ear defenders, and never force solo singing.
- **Hearing and motor differences.** Pupils with hearing loss can follow a visual pulse (a conductor's hand, a flashing light) and feel vibrations through the floor or a drum; pupils with motor differences can choose one body sound or a switch-operated instrument.
- **Grade level.** Lesson 1 was revised on 6 November 2026: the first version taught only quarter notes, eighth notes and rests, which many pupils meet in their first school years. It now treats those as a brief review and adds half notes and sixteenth notes. A music teacher should still judge whether the whole unit suits their grade 4 class.
- **Pitch.** This unit is mostly about rhythm and structure. Pitch (melody, tuning, notes on the staff) gets more time in grade 5 (see the progression).

Lesson 1: Pulse, rhythm and our first ostinato

Unit overview · Next: Lesson 2

Goal

Students feel the difference between the pulse (the steady beat) and a rhythm (the pattern of long and short sounds), quickly review the rhythms most classes met in earlier grades, add two new note values (a half note lasting two beats and four sixteenth notes in one beat), read and clap 4-beat rhythm cards, and keep one short repeated pattern, an ostinato, going while the teacher does something else.

Materials

- Circle space; board.
- Rhythm cards, each showing one bar of four beats. Three review symbols: a crotchet/quarter note (one sound lasting one beat), a pair of quavers/eighth notes (two sounds in one beat) and a crotchet/quarter rest (one beat of silence). Two new symbols: a minim/half note (one sound lasting two beats) and a group of four semiquavers/sixteenth notes (four sounds in one beat). Make about 10 cards: 3 with review symbols only, 7 that use at least one new symbol.
- Optional: untuned percussion; a metronome or drum for the pulse.

Steps

✎ Opening (5 min)

Teacher pats a slow, steady beat on their knees and invites everyone to join. Then, still patting, the teacher speaks a name or phrase over the beat ("Good morn-ing ev-ery-one"). Ask: Is the patting doing the same thing as the words? Establish the two words:

- **Pulse** (or beat): the steady, even "heartbeat" of the music that does not change.
- **Rhythm**: the pattern of longer and shorter sounds (and silences) that sits on top of the pulse, like the syllables of the words.

✎ Main activity (30-35 min)

1. **Pulse games (5 min).** Pass a pat around the circle, one person per beat. Speed it up and slow it down together. Then try "keep the pulse while I stop": the teacher stops patting and the class must keep going steadily for eight beats.
2. **Review, then two new values (8 min).** Quarter and eighth notes are usually the first rhythm values taught (Kodály method article), so most grade 4 classes already know them: spend only 2 minutes clapping the three review cards back, saying "ta" for one beat, "ti-ti" for two half-beats and a silent open-hand gesture for the rest. Then add the new symbols. Half note: clap once and hold your hands together for the second beat while the drum keeps the pulse (many classrooms say "ta-a"). Four sixteenth notes: four quick, even sounds inside one beat ("ti-ka-ti-ka" or "ti-ri-ti-ri"; syllables vary, so use

your school's). Point to cards and have the class clap them back while one pupil keeps the pulse on a drum.
3. **Card relay (8 min).** In groups of 4, each pupil picks a card. The group claps their four cards in a row as a 16-beat sequence, keeping the pulse steady between cards.
4. **First ostinato (10 min).** Explain: an **ostinato** is a short pattern that repeats over and over in the same part. The word is Italian and means "stubborn", like the English word "obstinate" (Ostinato article). Half the class claps one card on repeat (for example ta ta ti-ti ta). The other half claps different cards on top, changing each time the teacher points. Swap halves. Ask the ostinato group: What was hard about keeping going?

✓ Discussion questions (with example answers)

1. What is the difference between the pulse and the rhythm? — The pulse is steady and even and does not change; the rhythm is a pattern of long and short sounds that can change.
2. Why is it hard to keep an ostinato going while other people do something different? — Because you hear the other pattern and want to copy it; you have to listen to the pulse and to your own part.
3. Where else do you hear a pattern that repeats over and over? — Accept any sensible answers: a song's backing, a washing machine, a skipping rhyme, a clock ticking (the ticking is more like a pulse).

✓ Closing check (with answers)

1. The teacher claps four beats of steady, even claps, then a pattern of long and short claps. Which one was the pulse? — The steady, even one.
2. How many sounds do you clap for a pair of quavers/eighth notes? — Two, both inside one beat.
3. What do you do on a rest? — Nothing out loud: a beat of silence (keep counting it).
4. How many beats does a minim/half note last? — Two: one sound, held through the second beat.
5. How many sounds are in a group of four semiquavers/sixteenth notes, and how many beats does the group take? — Four sounds, all inside one beat.
6. What is an ostinato? — A short pattern that repeats over and over in the same part.

Vocabulary

pulse (beat), rhythm, rest, bar, ostinato, crotchet/quarter note, quaver/eighth note, minim/half note, semiquaver/sixteenth note

Differentiation

- **Support:** start with the three review symbols and add the half note before the sixteenth notes; let pupils point to the pulse on a picture of four hearts while others clap.
- **Stretch:** invent a new card and teach it to the group; clap one pattern while stepping the pulse with the feet.

⚠ Safety

Agree the stop signal before any instrument is used. Keep claps and drums at a comfortable volume. Seated pupils can pat knees instead of stepping.

Teacher notes and misconceptions

- Many pupils speed up while clapping rhythms, especially after quavers. A steady drum or metronome pulse helps; praise steadiness more than speed.
- Pupils often confuse "rhythm" with "beat". Keep coming back to the two pictures: a heartbeat (pulse) and the syllables of a word (rhythm).
- A rest is not "nothing happens": the pulse keeps going through it.

Lesson 2: Unison and layers — one song, two parts

Unit overview · Previous: Lesson 1 · Next: Lesson 3

Goal

Students sing a familiar song in unison, then add a rhythm ostinato underneath it, and hear how a repeating part can hold a piece together.

Materials

- A traditional song the class knows well (for example "Row, Row, Row Your Boat" or "Frère Jacques"; both are traditional children's rounds listed in the Round (music) article).
- Rhythm cards from lesson 1; untuned percussion or body percussion.
- A recording of one ostinato-based piece. The Ostinato article lists, for example, Ravel's Boléro and the "Carol of the Bells". Play a short extract only; check your school's rules on playing recordings.

Steps

✎ Opening (5 min)

Sing the chosen song together. Ask: Was everyone singing the same notes at the same time? Introduce **unison**: two or more parts sounding the same pitch (or the same note an octave apart), usually at the same time (Unison article). Point out that even in unison we can still tell voices apart, because each voice has its own "colour" of sound.

✎ Main activity (30-35 min)

1. **Listen first (5 min).** Play about a minute of the ostinato-based recording. Ask pupils to raise a hand when they spot something that keeps repeating, and to tap it quietly on their knee. Tell them that in popular music a repeating pattern like this is often called a **riff**, and in classical music the word **ground** is used for the same idea (Ostinato article).
2. **Build an ostinato for our song (10 min).** Choose a 4-beat card that fits the song, or make a spoken one from words in the song (for example "gent-ly, gent-ly" = ti-ti ti-ti then ta ta — any pattern that fits the pulse is fine). Everyone practises it alone first, then while the teacher sings.
3. **Two layers (10 min).** Split the class: group A sings the song in unison; group B performs the ostinato over and over until the song ends. Swap. Then try with a third, very simple layer: one pupil on a drum playing only the first beat of each bar.
4. **Listen back (5 min).** If you can, record one version and play it back. Ask: Which layer would you miss most if it stopped?

✓ Discussion questions (with example answers)

1. What is unison? — Everyone singing or playing the same notes at the same time (or the same note an octave higher or lower).
2. How did the ostinato change the song? — It made it fuller; it kept the beat steady; it made it sound more like a "real" band or piece.
3. What did group B need to do to stay together with group A? — Listen to the pulse, not to the tune; start together; keep going until the end.

✓ Closing check (with answers)

1. Twenty children sing the same tune at the same time. What is this called? — Singing in unison.
2. A pupil claps "ta ta ti-ti ta" again and again while others sing. What is the clapping part called? — An ostinato.
3. Give one other name for a repeating pattern in music, and where it is used. — Riff (popular music) or ground (classical music).
4. True or false: in unison, it is impossible to tell two different instruments apart. — False. They play the same pitch, but each instrument or voice has its own sound colour (timbre).

Vocabulary

unison, layer, part, ostinato, riff, ground, timbre (sound colour)

Differentiation

- **Support:** the ostinato group can say the pattern quietly as words while they clap it; give them a conductor who points on each beat.
- **Stretch:** create a second ostinato that fits with the first, so the song has three layers.

⚠ Safety

Keep singing at a comfortable volume and pitch. Check that percussion is not drowning out the singers; the stop signal still applies.

Teacher notes and misconceptions

- Pupils sometimes think "unison" means "everyone at exactly the same volume" or "everyone in a line". It is about the same notes at the same time.
- Groups often stop the ostinato when the singers pause between lines. Tell them in advance: the ostinato keeps going until you give the stop signal.
- An ostinato can be a rhythm, part of a tune or a whole melody (Ostinato article). This lesson uses rhythm only; pitched ostinatos can come later.

Lesson 3: Rounds — one tune that fits with itself

Unit overview · Previous: Lesson 2 · Next: Lesson 4

Goal

Students sing a round in two, then more, parts; explain how a round differs from unison; and learn a little of the round's long history.

Materials

- A traditional round the class knows well, for example "Row, Row, Row Your Boat" (a well-known children's round for four voices) or "Frère Jacques" (Round (music) article).
- A board split into four rows, one per group, to show when each group starts.
- Optional: coloured scarves or cards so each group can see its own colour.

Steps

✎ Opening (5 min)

Sing the song once in unison. Then say: Today the same tune is going to fit with itself. Ask for predictions: What will happen if half the class starts singing later than the other half?

✎ Main activity (30-35 min)

1. **What a round is (5 min).** A **round** is a piece in which several voices sing exactly the same melody, but each voice starts at a different time, and the parts still fit together. The Round (music) article calls it "one of the easiest forms of part singing", because everyone learns only one tune. A round is one kind of **canon**: a piece where one part copies another after a delay.
2. **Two parts (10 min).** Draw two rows on the board. Group 1 starts; when it reaches the end of the first line, the teacher points to group 2, which starts from the beginning. Each voice enters after the same amount of time and at the same pitch (the article calls this the "canon, or rule" of a simple round). Sing it twice through, then swap which group starts.
3. **Why does it fit? (5 min).** Explain simply: the tune is cut into equal blocks, and the notes that sound at the same moment in different blocks are either the same note or notes that sound good together in one chord (Round (music) article). Sing lines 1 and 2 at the same time slowly to hear it.
4. **Three or four parts (10 min).** Add groups 3 and 4. Each group can keep its own steady body-percussion pulse to help. Decide together how the round will end: everyone stops when group 1 finishes its third time, or each group drops out when it finishes, so the last group sings alone.
5. **A short history (5 min).** Share three facts from the Round (music) article:

6. the earliest known rounds come from 12th-century Europe (two pieces with Latin words in a manuscript from Notre Dame in Paris);
7. the oldest surviving round in English is "Sumer is icumen in" ("Summer has come in"), for four voices plus two lower voices singing a repeating part — a ground, like the ostinato from lesson 2;
8. the first rounds printed in English were published by Thomas Ravenscroft in 1609, and "Three Blind Mice" was among them, though in a somewhat different form from today's.

✓ Discussion questions (with example answers)

1. How is a round different from singing in unison? — In unison everyone sings the same notes at the same time; in a round everyone sings the same tune but starts at different times, so different parts of the tune sound together.
2. What was the hardest part of singing a round? — Not getting pulled into another group's part; starting at exactly the right moment; ending.
3. Why might rounds be good for singing with friends, even without a teacher? — Everyone only needs to learn one tune, and it still sounds like several parts.

✓ Closing check (with answers)

1. In a round, do the groups sing the same tune or different tunes? — The same tune.
2. What is different between the groups? — When they start.
3. Name one well-known children's round. — For example "Row, Row, Row Your Boat", "Frère Jacques" or "Three Blind Mice".
4. About how old are the earliest known rounds? — They date from 12th- century Europe, more than 800 years ago.

Vocabulary

round, canon, part, entry, unison, ground

Differentiation

- **Support:** sit groups close together with a confident singer in each; let a pupil be the "pointer" who signals entries instead of singing.
- **Stretch:** try the round as a **dance or clapping canon**: one group does a 4-move sequence and the next group starts it two beats later (this links to the grade 4 dance outline in the progression).

⚠ Safety

Watch for shouting: pupils often sing louder to stay in their part. Remind them that listening, not volume, keeps a round together.

Teacher notes and misconceptions

- Pupils often think the groups are "competing" or that one group is "wrong" when they hear clashes. Explain that the clashes are part of a round and resolve as the lines move on.
- If a group gets lost, it can simply stop and come back in at the start of the next line; that is a skill, not a failure.
- Not every song works as a round. If a pupil asks "can we do a round with any song?", try one: hearing it fail is a useful lesson.

Lesson 4: Song form — verses, choruses and letters

Unit overview · Previous: Lesson 3 · Next: Lesson 5

Goal

Students listen to whole songs, mark where sections start and repeat, and label the structure with letters and with the words **verse** and **chorus**.

Materials

- Two or three songs to listen to, chosen by the teacher (see notes): one where every verse has the same music and there is no separate chorus, and one with clearly different verse and chorus music. A traditional example of the first kind is "Barbara Allen"; "Oh! Susanna" is a traditional song with verses and a chorus. Both are named in the Strophic form article.
- A song-map sheet: a row of empty boxes, one per section, with space to write a letter and a word in each.
- Coloured pencils.

Steps

✎ Opening (5 min)

Ask: If a song were a building, what would its rooms be? Collect ideas. Explain that musicians split songs into **sections**, and that we can give each section a letter: the first kind of music is A, a different kind is B, and a section that comes back gets the same letter again.

✎ Main activity (30-35 min)

1. **Strophic songs (8 min).** Listen to the first song. Pupils hold up a finger each time a new verse starts. Ask: Did the tune change, or just the words? A song where every verse is sung to the same music is in **strophic form**, which can be written A A A (Strophic form article). Sometimes the tune changes a little in later verses; we can write that A A' A'' ("A, A-dash, A-double-dash").
2. **Verse and chorus (10 min).** Listen to the second song and fill in the song map. Explain the difference (Song structure article):
3. a **verse**: when its music comes back, it usually has **new words**; the verses tell the details or the story;
4. a **chorus**: it repeats both its **music and its words**, and it often carries the main message of the song and is the part people remember. The chorus often sounds different from the verse: louder, busier or with more instruments or voices (Verse–chorus form article).
5. **Refrain (5 min).** Some songs have no separate chorus section but repeat one short line inside each verse. This is often called a **refrain** (the words "chorus" and "refrain" are also used to mean the same thing; Song structure and Strophic form articles). Find

one together, for example the "fa la la la la" of "Deck the Halls", named as a refrain in the Song structure article.

6. **Share maps (7 min).** In pairs, compare song maps. Agree on one map for the second song and write it with letters, for example A B A B A B (verse, chorus, verse, chorus, ...). Note any extra sections: an **introduction** at the start, a **bridge** that appears once in the middle, or an **ending** (outro or coda).

✓ Discussion questions (with example answers)

1. How can you tell a verse from a chorus while listening? — The chorus has the same words each time; the verse words change. The chorus is often louder or fuller.
2. Why do so many songs repeat a chorus? — So listeners can remember it and join in; it carries the main idea; repetition makes music easier to follow.
3. Is a song with no chorus "missing" something? — No. Strophic songs, such as many ballads, hymns and folk songs, tell their story through repeated verses (Strophic form article).

✓ Closing check (with answers)

1. A song has four verses, all sung to the same tune, and no chorus. Write its form in letters. — A A A A (strophic form).
2. A song goes verse, chorus, verse, chorus. Write its form in letters. — A B A B.
3. Which section usually keeps the same words each time it comes back? — The chorus.
4. What is a bridge? — A different section that usually appears only once, often after the second chorus (Song structure article).

Vocabulary

section, form (structure), verse, chorus, refrain, strophic, introduction, bridge, ending (outro, coda)

Differentiation

- **Support:** give a song map with the boxes already started (for example "A verse" in the first box); pupils only mark when the chorus comes.
- **Stretch:** find a song with three different kinds of section (A B C), or a song in A B A form, where the first music comes back after a contrasting middle (this links to grade 5 in the progression).

⚠ Safety

Keep recordings at a comfortable volume, especially with headphones; use speakers where possible.

Teacher notes and misconceptions

- Song choice: use songs pupils know or that matter locally, from more than one tradition. Check copyright before copying lyrics; playing a recording in class may be fine where printing the words is not.
- "Oh! Susanna" can be heard either as verse-chorus or as one repeated section (verse and chorus together = A): the Strophic form article describes it that way. Accept either if pupils can explain their choice; form labels describe what we hear, they are not a single right answer.
- Pupils sometimes call the first verse "the chorus" because it comes first. Ask: Do the same words come back later?
- Pop songs often add a short **pre-chorus** that leads into the chorus; it is fine to mention but not needed at this grade.

Lesson 5: Compose, perform and respond

Unit overview · Previous: Lesson 4

This lesson may need two sessions: one to compose and rehearse, one to perform, respond and do the end check.

Goal

In groups, students compose and perform a short piece with a 4-bar rhythm ostinato and a clear structure, then give and use specific feedback.

Materials

- Rhythm cards from lesson 1; blank 4-beat cards; pencils.
- Untuned percussion or body percussion.
- A planning sheet per group (see step 1).
- A way to record performances, if available.
- End-check sheets.

Steps

✎ Opening (5 min)

Recap the unit with a quick "show me": clap a pulse; clap a rhythm card; which hand-sign means "rest"? Remind pupils of the three ideas they will use: **ostinato** (lesson 1-2), **layers and canon** (lessons 2-3) and **form** (lesson 4).

✎ Main activity (35-45 min, or across two sessions)

1. **Plan (10 min).** In groups of 4-5, pupils fill in a planning sheet:
2. **Our ostinato:** four 4-beat cards in a row (a 4-bar pattern), chosen or written by the group. Everyone must be able to clap it.
3. **Our chorus (B):** a short chant of 2-4 lines on a class theme (for example the weather, our town, a favourite food), spoken or sung in unison over the ostinato. The words stay the same every time.
4. **Our verses (A):** either new words each time (spoken by one or two pupils) or a different rhythm on a different instrument.
5. **Our form:** for example A B A B, or A B A, written in letters.
6. **One extra idea (choose at least one):** start with an introduction of the ostinato alone; perform the chorus as a 2-part canon (lesson 3); end with everyone stopping on the same beat.
7. **Rehearse (15 min).** Groups practise. The teacher visits each group and asks: Who keeps the pulse? How will everyone know when the chorus starts? How does the piece end?
8. **Perform (10-15 min).** Each group says its form in letters, then performs. If possible, record each piece.

9. **Respond (5-10 min).** After each performance, one pupil from another group gives feedback using the sentence: "I noticed you used ___ and it made ___", plus one suggestion: "Next time you could try ___". The performing group chooses one suggestion and, if there is time, performs again.

Group checklist (use while listening)

- Was the ostinato steady from start to end?
- Could you hear where the chorus started each time?
- Did the piece follow the form the group said?
- Did everyone in the group have a part?
- Did the piece have a clear ending?

✓ Discussion questions (with example answers)

1. What helped your group stay together? — One person kept a steady pulse; we counted in "1, 2, 3, 4"; we watched each other.
2. How did the form help the audience? — They knew when the chorus would come back and could even join in.
3. What would you change next time? — For example: a slower pulse, a louder chorus, a clearer ending, a canon in the chorus.

✓ End-of-unit check (8 questions, with answers)

1. What is the difference between the pulse and a rhythm? — The pulse is the steady, even beat that does not change; a rhythm is a pattern of long and short sounds (and silences) over it.
2. Clap or write: one bar with a quarter note, a pair of eighth notes, a quarter rest and a quarter note. How many sounds do you clap? — Four sounds (1 + 2 + 0 + 1) in four beats.
3. What is an ostinato? Give the meaning of the Italian word. — A short pattern repeated over and over in the same part; the word means "stubborn".
4. What does "in unison" mean? — Singing or playing the same notes at the same time (or the same note an octave apart).
5. How is a round different from singing in unison? — In a round, everyone sings the same tune but starts at different times.
6. Which is older: the earliest known rounds, or the first rounds printed in English? — The earliest known rounds (12th-century Europe) are older than the first printed in English (Thomas Ravenscroft, 1609).
7. A song goes verse, chorus, verse, chorus, bridge, chorus. Write it in letters. — A B A B C B.
8. Your friend says "a song without a chorus is a broken song". Do you agree? Explain. — No: songs where every verse uses the same music (strophic songs, such as many ballads and hymns) are complete; they use repetition in a different way. (Accept any answer that explains a reason.)

Vocabulary

compose, perform, rehearse, form, ostinato, chorus, verse, canon, introduction, ending, feedback

Differentiation

- **Support:** give a ready-made ostinato and form (A B A B); the group only writes the chorus words. Offer a conductor role.
- **Stretch:** add a second ostinato that fits with the first, or perform the chorus as a 3-part canon; write the piece out with rhythm cards so another group could perform it.

⚠ Safety

Use the agreed stop signal during group work, when the room gets loud. Spread groups out or use separate spaces so groups can hear themselves without raising the volume. Allow ear defenders for pupils who need them.

Teacher notes and misconceptions

- The aim is a clear, steady piece, not a long or complicated one. Short and steady beats long and messy.
- Some groups write long chorus words that do not fit the pulse. Ask them to speak the words over the ostinato early and cut syllables if needed.
- Feedback can drift into "it was good". Model the sentence frames first and ask for one specific thing the listener heard.
- Recording and playing back performances is powerful, but check your school's rules on recording pupils and do not share recordings outside the class without permission.

Grade 6 Arts: One-Point Perspective (5 lessons, about 2-3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 5 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules.

Back to the arts progression

Big idea

A flat picture can look deep. Artists use clues such as overlap, size and fading colour, and one geometric system, linear perspective, makes parallel lines that go away from us meet at a single vanishing point on the horizon. It is one way of showing space, not the only "correct" one: other times and places chose other ways, often on purpose.

Outcomes

By the end of the unit, students can:

- name and point out at least four depth clues in a picture (overlap, size, height on the page, detail and colour fading with distance);
- find the horizon line (eye level) and the vanishing point in a one-point perspective photograph or drawing, and draw the lines that run to it;
- draw boxes in one-point perspective above, on and below the horizon line, using a ruler and a vanishing point;
- explain in a sentence or two what Brunelleschi and Alberti are known for, and say why historians are unsure about parts of the Brunelleschi story;
- describe one other way of showing space or importance (for example hierarchical proportion or oblique projection) without calling it "wrong";
- plan and draw a one-point perspective scene of their own and explain one choice they made.

Prior knowledge

- From grade 3 (see the colour-mixing unit): tints, shades and value; the idea that colour choices can be explained.
- From grade 2 (see the arts progression): drawing from observation, looking before drawing.
- Using a ruler to draw a straight line between two points. No angle measuring is needed.

Lessons

1. How does a flat picture look deep?: find depth clues in pictures and in the room; meet hierarchical proportion.
2. Horizon line and vanishing point: find eye level, trace a real view through a clear sheet, and see parallel lines meet.
3. Drawing boxes in one-point perspective: draw boxes above, on and below the horizon; turn boxes into letters or buildings.

4. Who worked this out, and who chose differently?: Brunelleschi, Alberti, the "N times further, N times smaller" rule, and other traditions such as Chinese and Japanese oblique projection.
5. My own deep picture: plan and draw a one-point scene, add value and fading for depth, and give kind, specific feedback.

Materials (per pupil unless stated)

- Sharp HB pencil, eraser, 30 cm ruler; A4 or larger drawing paper.
- One sheet of clear acetate or a clear plastic document sleeve (about A4) and a dry-wipe or washable marker (lesson 2). Masking tape.
- Printed photographs with strong one-point perspective (a straight road, railway track, corridor, avenue of trees, tiled floor), one per pair. Use your own photos or openly licensed images and record the credit.
- Printed artworks for lessons 1 and 4, chosen locally; see the teacher notes in lesson 4 for public-domain examples you can look up.
- Optional: coloured pencils or a soft pencil (2B-4B) for shading (lesson 5).

Assessment

- **During the unit:** a depth-clues sheet (lesson 1), the traced view with horizon and vanishing point marked (lesson 2), a page of boxes (lesson 3), a short written comparison (lesson 4) and a finished drawing with a one-sentence explanation (lesson 5). Check them against the outcomes, not for neatness.
- **End check:** the closing check in lesson 5 (8 questions, with answers). There is no pass mark; use it to see who needs another go at finding the vanishing point.
- What to look for in the final drawing: a clear horizon line, receding edges that meet at one vanishing point, and at least one other depth clue. A "realistic" or polished look is not the target.

⚠ Safety (read before lesson 1)

- Rulers are for drawing, not for flicking or sword fights. Keep pencils pointed down when walking.
- If pupils look for the horizon outside or through a window, **never look at the sun**, directly or through the acetate sheet. Face away from it.
- Going outside or into corridors needs your school's normal supervision. Keep pupils out of roads, car parks and stairwells; photograph those views in advance instead.
- Trim or tape any sharp corners on acetate sheets. Use washable markers and wash hands after using them.

Sources

- Wikipedia, "Perspective (graphical)": https://en.wikipedia.org/wiki/Perspective_(graphical) (objects appear smaller as distance increases; an object looks N times smaller if it is moved N times further from the eye; foreshortening; objects recede to points usually along the horizon line; the picture-plane idea; Brunelleschi's experiments between 1415 and 1420 and the peephole-and-mirror demonstration of about 1420 reported by Vasari and Manetti; the problems with that story, including that his panel is lost; Alberti's De pictura (c. 1435)

and its use of similar triangles; Masaccio's Holy Trinity (c. 1427) with the vanishing point at the viewer's eye level, and the finding that many 15th-century works, including that fresco, show serious errors in their geometry; Chinese artists' use of oblique projection from the first or second century until the 18th century and its use in Japanese ukiyo-e by Torii Kiyonaga; earlier art sizing figures by importance).
- Wikipedia, "Vanishing point": https://en.wikipedia.org/wiki/Vanishing_point (parallel lines appear to converge at a vanishing point; when they are perpendicular to the picture plane the construction is called one-point perspective; Alberti introduced the concept in De pictura, 1435; straight railway tracks as a familiar example).
- Wikipedia, "Aerial perspective": https://en.wikipedia.org/wiki/Aerial_perspective (with distance, contrast and detail decrease and colours become less saturated, shifting towards the background colour, usually bluish; atmospheric perspective in Pompeian frescoes as early as 30 BCE).
- Wikipedia, "Hierarchical proportion": https://en.wikipedia.org/wiki/Hierarchical_proportion (unnatural scale used to show the relative importance of figures; in ancient Egypt higher-status people were sometimes shown larger).

Known gaps and cautions

- Linear perspective is taught here because it is a useful drawing tool and links to maths. It is not the measure of good art. Lesson 4 deliberately shows other systems as choices, not mistakes; keep that framing.
- The Brunelleschi story is a famous account, and the cited source lists open problems with it. Teach it as "the story usually told", with the doubts.
- Real views rarely line up perfectly; a vanishing point found on a photo will be approximate. Treat small misses as normal.
- Two- and three-point perspective, curvilinear perspective and the exact maths of spacing (such as how far apart floor tiles should look) are left for later grades or extension work.
- Some pupils find ruler work physically hard (for example with motor difficulties). Allow a partner to hold the ruler, a ruler with a grip, or a freehand "sketch" version judged on the idea, not the straightness.
- Pupils with low vision may need large-print photos and thick markers. A raised-line drawing (for example drawn with glue) lets a pupil feel lines meeting at a point.
- Sources are encyclopedia articles. No educator has reviewed this draft.

Lesson 1: How does a flat picture look deep?

Unit overview · Next: Lesson 2

Goal

Students find and name depth clues in pictures and in the room, and learn that some art uses size to show importance instead of distance.

Materials

- Per pair: one printed photograph of a deep scene (a street, a park, a landscape with hills) and one artwork that does not use linear perspective (for example an ancient Egyptian tomb painting or a medieval manuscript page; pick public-domain images locally).
- Per pupil: a depth-clues sheet with five boxes headed **Overlap**, **Size**, **Height on the page**, **Detail** and **Colour and contrast**.
- Pencils; optional sticky notes.

Steps

✎ Opening (5 min)

Hold up a sheet of paper. Ask: "How thick is this?" (Very thin.) Then show the deep photograph: "So how can a picture on something this thin look like it goes back for kilometres?" Collect ideas on the board without judging them.

✎ Main activity (25 min)

1. **Clue hunt (10 min).** In pairs, pupils look at their photograph and fill the five boxes, each with one example from the picture:
2. **Overlap:** something in front hides part of something behind.
3. **Size:** things of the same real size look smaller when further away.
4. **Height on the page:** in many views, things further away sit higher up the picture, closer to the horizon.
5. **Detail:** you can see bricks or leaves close up, but only blurs far away.
6. **Colour and contrast:** far hills look paler and bluer, with less contrast. This is called **aerial** or **atmospheric perspective**.
7. **Room check (5 min).** Pupils look down the classroom or along a corridor. Hold up a ruler at arm's length to compare the apparent size of a near door and a far door. Which looks bigger? Which is really bigger?
8. **A different idea (10 min).** Pairs now look at the second artwork. Ask: "Who is biggest? Are they nearest, or most important?" Explain that some artists sized figures by **importance**, not distance. This is called **hierarchical proportion**; in ancient Egypt, people of higher status were sometimes shown larger. Pupils add one sentence to their sheet: "In this picture, size shows ____."

✓ Discussion questions (with example answers)

- "Which depth clue was easiest to find? Which was hardest?" Example: overlap is easy because you can see edges; colour fading is hard indoors because there isn't much air between you and things.
- "Is the Egyptian painting a mistake because the king is too big?" Example: no. The artist was showing who mattered most. It is a different goal, not a failed attempt at a photograph.
- "Could a picture use size for importance and for distance?" Example: yes; for instance a poster might make a hero huge in front while the background still gets smaller.

✓ Closing check (5 min, with answers)

1. Name two depth clues. **Any two of: overlap, size, height on the page, detail, colour and contrast (aerial perspective).**
2. Why do far mountains often look pale and bluish? **The air between us and them lowers contrast and detail, and colours shift towards the background colour, usually bluish (aerial or atmospheric perspective).**
3. In hierarchical proportion, what does a bigger figure usually show? **That the figure is more important (for example higher status), not that it is nearer.**
4. True or false: a picture without vanishing points is badly drawn. **False. Many traditions show space or importance in other ways on purpose.**

Vocabulary

depth clue, overlap, aerial (atmospheric) perspective, contrast, detail, hierarchical proportion

Differentiation

- **Support:** give pupils picture cut-outs of each clue to match to the five boxes instead of writing; accept pointing and saying.
- **Stretch:** find a picture where two clues disagree (for example something high on the page that is clearly near, like a bird or a ceiling lamp) and explain why the "height on the page" clue fails there.

⚠ Safety

- If pupils walk into the corridor, follow your school's normal rules for moving around the building.

Teacher notes and misconceptions

- "Height on the page" works for things on the ground below eye level. Things above eye level (ceilings, birds, clouds) do the reverse: they get lower as they recede towards the horizon. Lesson 2 explains why.
- Aerial perspective needs a lot of air: hills, cities in haze, long valleys. Indoors it is hard to see; use photographs.

- Some pupils will say the Egyptian or medieval picture "looks wrong". Use it as a chance to separate "different from a photo" from "wrong". The source for this unit notes early art often sized figures by importance and did not use foreshortening.

Lesson 2: Horizon line and vanishing point

Unit overview · Previous: Lesson 1 · Next: Lesson 3

Goal

Students find the horizon line (eye level) and the vanishing point in a real view and in a photograph, and see that parallel lines going straight away from us appear to meet at one point.

Materials

- Per pupil: a clear acetate sheet or plastic document sleeve (corners taped) and a washable marker.
- Per pair: a printed one-point photograph (road, railway, corridor, tiled floor) and a ruler.
- A view with long straight parallel edges: a corridor, a long table, rows of desks, floor tiles or a path seen from one end.
- Masking tape; a chair to rest elbows on, or a window sill.

Steps

✎ Opening (5 min)

Show a photograph of straight railway tracks or a long straight road. Ask: "Do the two rails really get closer together?" (No: if they did, the train would fall off.) "So why do they look like they meet?" Tell pupils that today they will find exactly where they seem to meet.

✎ Main activity (25 min)

1. **Find your eye level (5 min).** Pupils stand and look straight ahead across the room, not up or down. Ask each one to point at a spot on the far wall that is level with their eyes. Then they sit and do it again. The spot moves down. Explain: in a drawing, the **horizon line** is a line that stands for the viewer's **eye level**. Outdoors on flat ground or at sea it is where land or sea seems to meet the sky; indoors it is hidden by walls, but it is still at your eye level.
2. **Trace a real view (12 min).** Pupils hold or tape the clear sheet upright in front of them (on a window, or resting on a chair back) and close one eye. Keeping the head still, they trace the main straight edges of the view with the marker: the sides of a corridor, the edges of a table, the lines between floor tiles. Then they draw a level line across the sheet at their eye level.
3. Remind them: one eye closed and head still, or the lines will jump.
4. This is a classroom version of the idea in the source: an imaginary flat **picture plane** facing the viewer, where lines from the scene to the eye pass through it.
5. **Extend the lines (8 min).** Lay the sheet flat. With a ruler, pupils extend the traced edges that run away from them. Where do they cross? Mark the crossing with a dot and label it **vanishing point (VP)**. Check: is the dot on or near the eye-level line? Then repeat quickly on the printed photograph with a ruler.

✓ Discussion questions (with example answers)

- "Did all your lines meet at exactly one point?" Example: nearly, but not perfectly, because my head moved a bit and real walls aren't perfectly straight. Close is good enough.
- "Which lines did not go to the vanishing point?" Example: the upright door edges stayed vertical and the top edge of the whiteboard stayed level. Only lines going straight away from me went to the point.
- "The floor lines went up to the horizon. Which way did the ceiling lines go?" Example: down. Things below eye level angle up to the horizon line; things above it slope down.

✓ Closing check (5 min, with answers)

1. What does the horizon line stand for in a drawing? **The viewer's eye level.**
2. What is a vanishing point? **The point where parallel lines going away from the viewer appear to meet.**
3. In one-point perspective, which lines go to the vanishing point? **The lines going straight away from the viewer. Vertical lines stay vertical and lines running straight across stay horizontal.**
4. You sit down. Does the horizon line in your view move up or down? **Down, because your eye level is lower.**

Vocabulary

horizon line, eye level, vanishing point, parallel, picture plane, one-point perspective

Differentiation

- **Support:** give a photograph with two long edges already highlighted in colour; the pupil only extends those two lines to find where they cross.
- **Stretch:** find a photograph where the vanishing point is not in the middle (for example a road curving to one side or a corridor seen from near one wall). What changed? Try a view from lying on the floor or standing on a low step (with supervision): where is the horizon now?

⚠ Safety

- If tracing through a window, face away from the sun and never look at the sun through the sheet.
- Standing on steps only on a stable, school-approved step with an adult nearby; never on chairs or tables.
- Keep doorways and corridors clear for others while tracing.

Teacher notes and misconceptions

- **"The horizon is where the sky is."** Not quite: in a drawing it stands for eye level. In a mountain photo the land may hide it; in a room the walls do. The source for this lesson describes the horizon line as a line representing the observer's eye level.
- **"Everything goes to the vanishing point."** In one-point perspective only the set of lines running straight away from you does. Verticals stay vertical and the widths facing you stay horizontal. Lesson 3 uses this.
- Many pupils draw the horizon at the top of the page out of habit. Ask: "Where were your eyes?"
- Railway tracks are the classic example in the source. Use a photograph; never take pupils near real tracks.

Lesson 3: Drawing boxes in one-point perspective

Unit overview · Previous: Lesson 2 · Next: Lesson 4

Goal

Students use a horizon line, one vanishing point and a ruler to draw boxes above, on and below eye level, then turn boxes into letters or buildings.

Materials

- Per pupil: A4 or A3 paper (landscape), sharp HB pencil, eraser, 30 cm ruler.
- Optional: a sheet with a horizon line and VP already printed, for support.
- A board demonstration (or a visualiser/document camera).

Steps

✎ Opening (5 min)

Draw a plain square on the board. Ask: "Is this a box or a square?" Then add three lines to its corners running to a dot. "Now?" Most pupils will see a box. Today they learn the steps so the box always looks right.

✎ Main activity (25 min)

Demonstrate each step on the board, then pupils copy it. Draw lightly: some lines will be rubbed out.

1. **Set up.** Draw a horizontal **horizon line** across the middle of the page. Put one dot on it near the centre: the **vanishing point (VP)**.
2. **Front face.** Below the horizon and to the left, draw a rectangle with the ruler: two horizontal sides, two vertical sides. This is the side of the box facing you, so it is drawn flat, with no slant.
3. **Lines to the VP.** From each corner of the rectangle, draw a light line to the VP. (Pupils can skip any corner whose line would pass through the front face, because that edge is hidden.)
4. **Back edges.** Decide how deep the box is. Somewhere along those lines, draw the back edge: a **horizontal** line for the back top edge and a **vertical** line for the back side edge, each stopping where it meets the lines to the VP. Back edges are parallel to the front edges.
5. **Clean up.** Rub out the parts of the lines beyond the back edges. Darken the box outline. Shade the top or side lightly so it reads as solid.
6. **Three positions.** Draw two more boxes: one above the horizon (you see its underside) and one on the horizon, to one side of the VP (you see neither top nor bottom). Compare what is visible in each.

7. **Make it yours (remaining time).** Turn a box into a block letter (the first letter of your name), a building with doors and windows, or a row of boxes getting further away down a street. Windows on the front face stay rectangles; windows on a side face have top and bottom edges that run to the VP.

✓ Discussion questions (with example answers)

- "Why can you see the top of a box below the horizon but not one above it?" Example: the horizon is my eye level. If the box is lower than my eyes I look down onto it; if it is higher I look up at its underside.
- "Why are the back edges drawn horizontal and vertical, not slanted?" Example: they are parallel to the front edges, which face me. Only edges going away from me slant to the VP.
- "What happens if two boxes on the same page use different VPs?" Example: the picture looks broken, as if seen from two places at once, unless the boxes are turned at different angles on purpose.

✓ Closing check (5 min, with answers)

1. In one-point perspective, how is the front face of a box drawn? **As a flat rectangle (or square) with horizontal and vertical sides, no slant.**
2. Where do the receding edges of the box go? **To the vanishing point on the horizon line.**
3. A box floats above the horizon line. Which face can you see besides the front? **The bottom (underside), plus a side face if it is to the left or right of the VP.**
4. A box sits exactly on the horizon line, to the right of the VP. Which faces can you see? **The front and the left side. Neither the top nor the bottom.**

Vocabulary

front face, receding lines (orthogonals), back edge, horizon line, vanishing point, construction lines

Differentiation

- **Support:** a sheet with the horizon, VP and three front rectangles already printed; the pupil draws only the lines to the VP and the back edges. A partner may hold the ruler.
- **Stretch:** draw a row of identical fence posts or lamp posts going away from you, each smaller than the last, using two lines to the VP from the top and bottom of the first post to keep the tops and bottoms in line. Or draw a box with a hollow inside (an open crate).

⚠ Safety

- Rulers are drawing tools; no flicking or swinging. Pencils point down when walking to the sharpener.

Teacher notes and misconceptions

- **Slanting the front face.** Pupils often tilt the front rectangle as if it were receding. Remind them: the face that looks straight at you is drawn flat.
- **Back edge drawn to the VP.** If a back edge slants, the box will look twisted. Back edges are always parallel to front edges in one-point.
- **Boxes that look too long.** If a box is drawn very deep, or far from the VP, it can look stretched. That is a real limit of the method near the edges of a picture; keep boxes reasonably close to the VP for now.
- The receding lines are often called **orthogonals** in art teaching. The word is optional; "lines to the VP" works.
- Keep construction lines light. Pupils who press hard will struggle to rub them out; show them the difference before starting.

Lesson 4: Who worked this out, and who chose differently?

Unit overview · Previous: Lesson 3 · Next: Lesson 5

Goal

Students test the rule that something looks N times smaller when it is N times further away, hear the usual story of Brunelleschi and Alberti along with its doubts, and compare linear perspective with other ways artists have shown space.

Materials

- Per group of 3: an A4 sheet of card (29.7 cm tall), a ruler, a metre stick or tape measure, masking tape to mark distances on the floor.
- Printed images, one set per group (see teacher notes for what to look up): a 15th-century Italian painting using linear perspective; a Chinese or Japanese picture using oblique projection; an ancient Egyptian painting using hierarchical proportion.
- A comparison sheet with three columns: **How is space shown?**, **What do you notice first?**, **What might the artist have wanted?**

Steps

✎ Opening (5 min)

Tell the story usually told, in about two minutes:

> In Florence, between about 1415 and 1420, the architect Filippo Brunelleschi is said to have made careful perspective pictures of buildings. In one famous demonstration, a viewer looked through a small hole in the back of his painting of the Baptistery, at a mirror held up in front, and could compare the reflected painting with the real building. About 1435 his friend Leon Battista Alberti wrote a book, De pictura (On Painting), explaining how to show distance, and introduced the idea of the vanishing point.

Then add: "Historians are not sure all of this happened as told. Why might that be?" Collect ideas, then give the reasons from the source: the painting is lost; no other perspective picture by Brunelleschi is known; the main written account comes from decades later and never uses the word "experiment"; and some details in it contradict each other.

✎ Main activity (25 min)

1. **Test the size rule (12 min).** One pupil holds the A4 card upright at chest height. A second stands 2 m away, holds a ruler at arm's length, closes one eye and measures how tall the card looks on the ruler. A third records. Repeat at 4 m and 8 m, keeping the same arm straight each time. Groups compare: what happened to the measurement each time the distance doubled? (It roughly halved.) Explain: the source states that an

object looks N times smaller if it is moved N times further from the eye. Alberti worked out apparent sizes with **similar triangles**, a piece of geometry pupils will meet in maths.

2. **Compare three pictures (13 min).** Groups fill one row of the comparison sheet for each image:
3. **Linear perspective** (the Italian painting): lines run to a vanishing point; we see one moment from one spot.
4. **Oblique projection** (the Chinese or Japanese picture): receding edges stay parallel and do not meet, so things far back are not shrunk. Chinese artists used this from about the first or second century until the 18th century, and it appears in Japanese ukiyo-e prints, for example by Torii Kiyonaga (1752-1815).
5. **Hierarchical proportion** (the Egyptian painting): size shows importance. Finish with one sentence: "One thing oblique projection or hierarchical proportion can do that one-point perspective can't is ____."

✓ Discussion questions (with example answers)

- "Did your measurements halve exactly?" Example: not exactly, because arms wobble and it's hard to read a ruler that far away, but close. Real measurements always have some error.
- "Masaccio's Holy Trinity (about 1427) puts the vanishing point at the viewer's eye level. Experts have still found errors in its geometry. Does that make it a worse painting?" Example: no. It still looks deep and people have admired it for centuries. "Correct geometry" and "a good painting" are different questions.
- "Why might a long scroll painting avoid a single vanishing point?" Example: you look at it bit by bit as you unroll it, so there isn't one place to stand. Parallel lines let every part of it be seen the same way. (This is a reasonable idea to discuss, not a fact from the source.)

✓ Closing check (5 min, with answers)

1. A tree looks 6 cm tall on your ruler. You walk back until you are three times as far away. About how tall does it look now? **About 2 cm (three times smaller).**
2. What book did Alberti write, and about when? **De pictura (On Painting), about 1435.**
3. Give one reason historians are unsure about the Brunelleschi story. **Any one of: his panel is lost; no other perspective picture by him is known; the main account was written decades later and doesn't call it an experiment; details in the account contradict each other.**
4. In oblique projection, do receding lines meet at a vanishing point? **No. They stay parallel.**

Vocabulary

linear perspective, oblique projection, hierarchical proportion, similar triangles, treatise, Renaissance

Differentiation

- **Support:** for the size test, give a recording table with the distances already filled in, and accept "smaller, then smaller again" before numbers. For the comparison, give sentence starters.
- **Stretch:** plot the group's three measurements against distance. What would you predict at 16 m? Or: find out what "foreshortening" means (an object's depth along the line of sight looks shorter than its width facing you) and find an example in one of the pictures.

⚠ Safety

- Mark distances with tape in a clear space indoors or on a playground; keep away from doorways and traffic routes.
- Measuring with one eye closed while walking is a trip risk: stand still to measure, walk with both eyes open.

Teacher notes and misconceptions

- **What to look up.** These works are centuries old and in the public domain, but photographs of them carry different licences, so check and record the credit of the image you print: Masaccio, Holy Trinity (about 1427); a painting by Piero della Francesca (the source calls his paintings a model of the genre); a print by Torii Kiyonaga; an ancient Egyptian tomb painting. Local galleries and museum websites with open-access images are a good place to look.
- **"Brunelleschi invented perspective."** Earlier artists already showed far things smaller; the source describes ancient Greek stage scenery (skenographia), Euclid's Optics (about 300 BC), and Roman frescoes using several vanishing points "in a systematic but not fully consistent manner". The Florentine contribution was a consistent geometric system. Alberti was trained in optics under the influence of a scholar who studied Alhazen's Book of Optics, translated into Latin around 1200.
- **"Other traditions didn't know how."** Avoid this. The source says medieval European, Islamic and Chinese artists knew far things look smaller but were ready to override it for other reasons. Present systems as choices.
- The size rule uses the apparent height on a ruler at a fixed arm's length. Numbers will differ between pupils (arm lengths differ); the halving pattern is the point.

Lesson 5: My own deep picture

Unit overview · Previous: Lesson 4

Goal

Students plan and draw a scene of their own in one-point perspective, add at least one other depth clue, explain one choice, and give kind, specific feedback in a gallery walk.

Materials

- Per pupil: A3 or A4 drawing paper, HB pencil, eraser, ruler; a soft pencil (2B-4B) or coloured pencils for shading.
- Pupils' lesson 1-3 work for reference; the printed photographs from lesson 2.
- Sticky notes for feedback; a sentence-starter card: "I notice you used ___ and it makes ___."

Steps

✎ Opening (5 min)

Show two or three quick ideas on the board: a corridor of doors, a street of box buildings, a tunnel or bridge, a room seen from the doorway, a made-up place (a library of giant books, a city for ants). Rules for the picture:

- one horizon line and one vanishing point;
- at least three objects drawn in one-point perspective;
- at least one **other** depth clue from lesson 1 (overlap, size, detail, or lighter, lower-contrast tones for far things).

✎ Main activity (25 min, plus time in a following session if needed)

1. **Plan (5 min).** Pupils make a small thumbnail sketch (about the size of a playing card). Decide where to put the horizon: low (looking up, things feel tall), middle, or high (looking down, like a bird). Mark the VP.
2. **Construct (10 min).** On the big sheet, draw the horizon and VP lightly, then the main boxes or walls using the lesson 3 steps. Keep construction lines light.
3. **Add depth and value (10 min).** Rub out unneeded lines. Shade one side of each object to show where the light comes from (the grade 3 idea of value). Make near things darker and more detailed, far things lighter and simpler.
4. **Explain (in the last 2 minutes).** On the back, pupils write one sentence: "I put my horizon ___ because ___."

Gallery walk and feedback (5-10 min)

Drawings go on desks. Pupils walk round and leave one sticky note on two drawings, using the sentence starter. Feedback must name something in the picture (for example "I notice you made

the far windows lighter and it makes the street look long"). No "it's bad" or "it's good" without a reason.

✓ Discussion questions (with example answers)

- "Where did people put their horizons, and how does that change the feel?" Example: a low horizon makes buildings tower over you; a high one makes it feel like looking down from a window.
- "Did anyone break a rule on purpose? Did it work?" Example: someone drew a giant character on purpose to look important, like hierarchical proportion. It works if it is clearly a choice.
- "What was hardest?" Example: keeping all the lines going to one point, and stopping back edges in the right place.

✓ End-of-unit check (8 questions, with answers)

1. Name three depth clues an artist can use. **Any three of: overlap, size (far things smaller), height on the page, detail, colour and contrast fading (aerial or atmospheric perspective), linear perspective.**
2. What does the horizon line stand for? **The viewer's eye level.**
3. What is a vanishing point? **The point where parallel lines going straight away from the viewer appear to meet.**
4. In one-point perspective, which edges of a box are drawn exactly horizontal or vertical? **The edges of the front face and the back edges (all edges facing the viewer). Only edges going away from the viewer run to the vanishing point.**
5. A box is below the horizon. Can you see its top or its bottom? **Its top.**
6. A lamp post looks 9 cm tall on your ruler. You move to three times the distance. About how tall does it look now? **About 3 cm.**
7. Who wrote De pictura about 1435, and what idea did it introduce? **Leon Battista Alberti; it introduced the vanishing point and explained how to show distance in painting (using similar triangles).**
8. A classmate says ancient Egyptian painters "couldn't draw perspective". Give a better explanation. **They often used hierarchical proportion on purpose, making important people larger. It shows importance, not distance; it is a different choice, not a failure.**

Vocabulary

thumbnail sketch, composition, horizon line, vanishing point, value, feedback

Differentiation

- **Support:** start from a sheet with the horizon, VP and one box already drawn, and add two more objects. A partner may hold the ruler. Accept a verbal explanation instead of the written sentence.
- **Stretch:** add a second set of objects that are turned at an angle (a hint of two-point perspective, with two VPs on the same horizon), or draw a reflection in a puddle or tiled

floor. Or draw the same scene twice, once in one-point perspective and once in oblique projection, and write which you prefer and why.

⚠ Safety

- Rulers and pencils as in earlier lessons. During the gallery walk, walk, don't run; touch only your own work and the sticky notes.

Teacher notes and misconceptions

- Assess against the three rules, the explanation and the feedback, not realism or neatness. A messy drawing with one clear VP and a sensible horizon meets the goal.
- **Several VPs by accident.** Ask the pupil to put a ruler on two receding lines and see where they meet. If they meet in different places, choose one VP and redraw lines to it.
- **Everything shrinks to a dot.** Some pupils make all objects end at the VP. Remind them the back edge stops the box; only construction lines reach the VP.
- Keep the feedback kind and specific; the same sentence starter is used in the grade 3 colour unit, so many pupils will know it.
- Pupils who want to share drawings outside the class should credit any photograph they copied from and follow school rules on displaying work.

Grade 10 Arts (Drama): Devising a Short Scene — Offers, Status, Objectives and Staging (5 lessons, about 2-3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 5 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every safety note against your school's rules.

Back to the arts progression

Big idea

A scene does not have to start from a script. A small group can build one together: accept each other's ideas, decide who wants what from whom, notice who holds power in the moment, and then choose where bodies stand and move so an audience can see all of that. This way of making theatre is called devising, and it is also a good way to understand any play from the inside.

Outcomes

By the end of the unit, students can:

- in an improvised scene, recognise an offer, accept it and add to it ("yes, and"), and explain what blocking an offer does to a scene;
- show a clear shift in status between two characters using only stance, eye contact, space and pace, and describe what changed;
- state a character's objective as an active verb aimed at another person ("I want to make her ___"), name the given circumstances, and mark one point in a scene where the objective changes;
- use stage directions correctly (upstage, downstage, stage left and right from the actor's view, house left and right) and record blocking in a simple script or plan;
- devise, rehearse and perform a 2-3 minute group scene from a stimulus, with a clear beginning image, at least one change, and a final image;
- give and use specific feedback that points to a moment in the work.

Prior knowledge

- From earlier grades in the arts progression: freeze frames and mirroring (grades 1-2), improvised scenes (grade 3), process drama (grade 4), blocking (grade 5) and status and motivation (grade 6). If your students have not done drama before, spend longer on lessons 1 and 2; nothing here assumes they can act "well".
- Working in a group of 3-5 and keeping to a stop signal.

Lessons

1. Offers and "yes, and": build scenes by accepting and adding to each other's ideas; see what blocking an offer does.
2. Status: who has the power right now?: play high and low status with the body, then swap status inside a scene.

3. What does the character want?: objectives as active verbs, given circumstances, and the moment a character changes tactic.
4. Staging: where bodies stand tells the story: stage directions, blocking, sightlines, freeze-frame images and a few Viewpoints tools.
5. Devise, rehearse, perform: build a scene from a stimulus, rehearse it, perform it and give feedback.

Materials

- A clear open space (a drama studio, hall or a classroom with desks pushed back) with a marked "stage" area and a marked audience side. Masking tape to mark the stage edges and a centre point.
- A set of chairs (one per student) and a few blocks or boxes that are safe to sit on.
- Index cards and pens; a printed stage-areas diagram (lesson 4).
- Stimulus cards for lesson 5, chosen by the teacher (see lesson 5 for examples). Use original prompts, public-domain texts or images, or openly licensed images with their credits.
- Optional: a device to record performances, **only with the consent of everyone filmed** and following your school's policy.

Assessment

- **During the unit:** short reflections at the end of each lesson, a written objective and beat change for a character (lesson 3), a blocking plan with stage directions (lesson 4), and the group's devising log (lesson 5). Check them against the outcomes.
- **Performance (lesson 5):** look for an opening image, a clear change (of status, objective or situation), staging the audience can see, and a final image. Polish, volume and confidence are not the target; clear choices are.
- **End check:** the closing check in lesson 5 (8 questions, with answers). There is no pass mark.
- Students who do not perform (see Safety) are assessed on the same choices through their role as director, stage manager or designer and their written plan.

⚠ Safety (read before lesson 1)

- **Physical space.** Clear bags and trailing cables. Agree a stop signal (for example a raised hand and "freeze") that ends all movement at once. Warm up before physical work.
- **No stage combat, lifts or falls** in this unit. Conflict is shown with distance, stillness, voice and status, not contact. Stage combat needs specialist training.
- **Touch only with consent.** Before any scene, groups agree whether touch is in or out. A handshake or hand on a shoulder is the most allowed, and only if both people agree; anyone can change their mind.
- **Emotional safety.** Scenes are fiction. Students must not use real personal trauma, real classmates, teachers or family members, or real private events as material. Steer stimuli away from self-harm, abuse and similar topics unless your school has a trained adult and a plan for them.
- **Status work** (lesson 2) can echo real social hierarchies. Never ask a student to play a status that mocks a real person, group, disability or identity, and rotate roles so no one is always "low".

- **Opt-outs that are still participation.** Any student can choose a role off stage (director, stage manager, sound, notes) for any activity, without explaining why. Anxiety about performing is common; small-group showings can come before showing to the whole class.
- **Voice.** No screaming. Projection comes from breath, not strain.

Sources

Read 5 November 2026.

- Wikipedia, "Devised theatre": https://en.wikipedia.org/wiki/Devised_theatre (devising, also called collective creation, is theatre-making where the script or performance score comes from collaborative, often improvisatory work by an ensemble; work can begin from an image, a plot, a theme, a character, historical documents, a novel or a single line; common approaches include improvisation, physically expressive performance, a long development process and a period of accrual and excess followed by selection, editing and refining; a director, if any, often acts as a facilitator; prototypes in mime, clowning and commedia dell'arte; named companies such as Complicité and Frantic Assembly).
- Wikipedia, "Improvisational theatre": https://en.wikipedia.org/wiki/Improvisational_theatre (an offer defines some element of the scene's reality, such as a name, relationship or location; not accepting offers is called blocking, negation or denial and usually prevents the scene from developing; accepting and adding a new offer is "Yes, and...", described as the cornerstone of improvisational technique; "space object work" developed by Viola Spolin and keeping imaginary objects consistent).
- Wikipedia, "Keith Johnstone": https://en.wikipedia.org/wiki/Keith_Johnstone (British-Canadian educator and theatre director, 1933-2023, a pioneer of improvisational theatre who invented the Impro System and Theatresports; co-founded the Loose Moose Theatre in 1977; slogans including "You can't learn anything without failing" and "It's not the offer, but what you do with it").
- Wikipedia, "Impro: Improvisation and the Theatre": https://en.wikipedia.org/wiki/Impro:_Improvisation_and_the_Theatre (Johnstone's 1979 book has four sections: "Status", "Spontaneity", "Narrative Skills" and "Masks and Trance"). The status exercises in lesson 2 are common drama-classroom practice associated with this book; the source only confirms that the book has a section on status, not the details of any exercise.
- Wikipedia, "Stanislavski's system": https://en.wikipedia.org/wiki/Stanislavski%27s_system (a performance is driven by a sequence of "tasks", called "objectives" in Elizabeth Hapgood's English translation, often framed as "What do I want?" or "What do I need to make the other person do?"; "given circumstances" come mainly from the playwright but also from the director, designers and other actors; parts are broken into "bits" (often called "beats") separated by reversal points; "The best analysis of a play is to take action in the given circumstances").
- Wikipedia, "Blocking (stage)": https://en.wikipedia.org/wiki/Blocking_(stage) (blocking is the precise arrangement of actors; the term comes from 19th-century directors such as W. S. Gilbert using blocks on a miniature stage; upstage is furthest from the audience and downstage nearest, from the days of raked stages; stage left and right are the actor's left and right facing the audience, house left and right the audience's; to cross is to move; the stage manager records blocking; in German, Italian and Arabic, left and right always mean the audience's view, and French uses côté cour and côté jardin for house right and house left).

- Wikipedia, "Tableau vivant": https://en.wikipedia.org/wiki/Tableau_vivant ("living picture": a static, silent, posed scene; performers in film or theatre sometimes briefly freeze for this effect).
- Wikipedia, "Viewpoints": https://en.wikipedia.org/wiki/Viewpoints (Mary Overlie's Six Viewpoints from the 1970s: Space, Shape, Time, Emotion, Movement, Story; adapted by Anne Bogart and Tina Landau, whose 2005 book lists time viewpoints Tempo, Duration, Kinesthetic Response and Repetition and space viewpoints including Shape, Gesture, Architecture, Spatial Relationship and Topography, with definitions).
- "Freeze frame", "warm-up", "hot-seating" and "thought-tracking" are used here as common drama-classroom terms, not taken from the sources above.

Known gaps and cautions

- The named approaches (Stanislavski, Johnstone, Viewpoints) come from European and North American theatre. Many traditions build performance collectively in other ways; the devised theatre source notes that some cultural traditions have always done so. Invite local theatre makers and traditions where you can.
- Status is a tool for making scenes, not a theory of how people should treat each other. Discuss that difference explicitly (lesson 2).
- Students with mobility impairments, including wheelchair users, can do every activity: status, objectives and staging are about relationships in space, not about standing or walking. Adapt warm-ups and plan blocking with the student. Students who do not speak, or who use AAC, can perform through movement, gesture, sign or a recorded voice.
- Students with anxiety or who are new to drama: use small groups, allow off-stage roles, and do not cold-call for solo performance.
- A real drama programme would follow this with scripted work, design and a longer production. This unit is only one entry into the grade 10 ensemble work described in the progression.
- Sources are encyclopedia articles. No educator has reviewed this draft.

Lesson 1: Offers and "yes, and"

Unit overview · Next: Lesson 2

Goal

Students build short improvised scenes by noticing each other's offers, accepting them and adding to them, and they see what happens to a scene when an offer is blocked.

Materials

- Open space with a marked stage area and audience side.
- A few chairs.
- Index cards with simple locations written on them (for example: a bus stop, a lost-property office, a lighthouse, a bakery at 5 a.m.).

Steps

✎ Opening (5 min)

Agree the stop signal and the touch rule for the unit (see the unit Safety section). Quick warm-up: everyone walks around the space, filling the gaps. On "freeze" they stop; on "go" they walk again. Then add: on "freeze" they make an instant group shape of a word you call out ("a forest", "a machine", "a queue").

✎ Main activity (30 min)

1. **The gift game (8 min).** In pairs. A mimes handing B an invisible object, without saying what it is. B accepts it and names it out loud ("Oh, a jar of ... live snails!") and uses it. Then B hands A a new object. Keep it going for two minutes, then swap who starts.
2. Point out that the object stays where it is put. If someone puts a jar on a table, nobody walks through that table. Improvisers call this space object work.
3. **"Yes, but" versus "yes, and" (10 min).** In pairs, plan a class trip to anywhere. Round 1: every reply must start "Yes, but ..." and raise a problem. Round 2: every reply starts "Yes, and ..." and adds something. Ask: which conversation went further? Which was more fun to watch?
4. **Offers in a scene (12 min).** Groups of three take a location card. They play a one-minute scene. Anything a performer says or does that defines the scene (a name, a relationship, a place, an object, a problem) is an **offer**. The audience calls out the offers they spotted afterwards. Then the group replays it once with one deliberate block ("We're not at a bus stop, this is a swimming pool") and the class discusses the difference.

✓ Discussion questions (with example answers)

- "What counts as an offer?" Example: anything that defines what is real in the scene: someone's name, that we're siblings, that it's raining, that I'm holding a parcel.
- "What did the block do to the scene?" Example: it stopped. The other performer had to throw away their idea and we were back at the start, so the audience lost track.
- "Is 'yes, and' the same as agreeing with everything the other character says?" Example: no. My character can argue or refuse inside the story; what I accept is the reality my partner made, not my character's opinion. "You stole my bike!" "I did, and I'd do it again" accepts the offer.

✓ Closing check (5 min, with answers)

1. In improvisation, what is an offer? **Anything said or done that defines part of the scene's reality, such as a name, relationship, place or object.**
2. What is it called when a performer refuses an offer, and what does it usually do? **Blocking (or negation or denial); it usually stops the scene from developing.**
3. Your partner says "Captain, the ship is sinking!" Give a "yes, and" reply. **Any reply that accepts the ship sinking and adds something, for example "Then grab the map, we're rowing to the island."**
4. Which drama teacher, known for the Impro System and Theatresports, said "It's not the offer, but what you do with it"? **Keith Johnstone.**

Vocabulary

improvisation, offer, accept, block (in improvisation), "yes, and", space object work, ensemble

Differentiation

- **Support:** play the gift game with real objects first (a scarf, a cup), then switch to invisible ones. Allow a student to give offers only through mime.
- **Stretch:** play a scene where every line must be an offer and the scene must end at a new location. Or try a scene with one character who says nothing and makes all their offers through action.

⚠ Safety

- Keep warm-up walking at walking pace; no running in a crowded space.
- Any student can join the audience role of "offer spotter" instead of performing, and that counts as taking part.
- Steer scenes away from real classmates and teachers as characters.

Teacher notes and misconceptions

- **Two meanings of "blocking".** In improvisation, blocking means refusing an offer. In staging (lesson 4) it means planning where actors stand and move. Name the clash now so lesson 4 does not confuse anyone.

- **"I'm not funny, so I can't improvise."** The aim here is to notice and build, not to be funny. Johnstone's slogans in the source include "You can't learn anything without failing"; let early scenes be clumsy.
- The source says the "yes, and" rule applies to a scene's early stage, when a shared reality is set up. After that, characters can and should disagree; performers still keep the reality they built together.

Lesson 2: Status: who has the power right now?

Unit overview · Previous: Lesson 1 · Next: Lesson 3

Goal

Students show high and low status using stance, eye contact, space and pace, and they shift status between characters inside a short scene.

Materials

- Open space, chairs.
- A pack of playing cards (or cards numbered 1-10) for the status game.
- Two-line scene starters on cards, for example:
- A: "You're late." B: "I know."
- A: "Is this yours?" B: "Maybe."
- A: "Can I help you?" B: "I hope so."

Steps

✎ Opening (5 min)

Walk the space again. Call out: "Walk as if you own this room." Then: "Walk as if you hope nobody notices you." Then: "Walk as if you own the room but don't want anyone to know." Ask what people changed in their bodies.

✎ Main activity (30 min)

Tell students that in drama **status** means who has the upper hand between characters at this moment. It is about behaviour in a scene, not about job titles or real-life worth: a servant can play high status and a king low. Keith Johnstone's 1979 book Impro has a whole section on status, and status games like these are common in drama classrooms.

1. **Status signals (8 min).** In pairs, A and B stand facing each other. Try one change at a time and notice how it feels and looks:
2. eye contact held steadily versus looking away and back;
3. head still while speaking versus small nods and touches to the face;
4. taking up space (feet apart, arms relaxed) versus making yourself small;
5. moving slowly and pausing before speaking versus moving quickly and filling silences. Students write two signals of each kind on a card. These are stage conventions that work in many classrooms; they are not rules about real people or cultures (see Teacher notes).
6. **The card game (10 min).** Each student secretly draws a card (1 = lowest status, 10 = highest) and holds it to their forehead without looking, so others can see it but they cannot. Everyone mingles at a party and treats each person according to the number

they see. After two minutes, students line up in the order they think they are. Then they look. Discuss how they could tell.

7. **Status see-saw (12 min).** In pairs with a two-line scene starter, play a short scene in which A starts high and B low, and by the end they have swapped. The audience calls "Swap!" at the moment they saw the change and says what caused it (a revelation, a mistake, a piece of news, a change of position).

✓ Discussion questions (with example answers)

- "What was the single most powerful status signal?" Example: stillness. When she stopped moving and just looked, she was suddenly in charge, even without speaking.
- "Can someone be high status and kind?" Example: yes. A calm doctor can be high status and gentle; the status is about control of the moment, not meanness.
- "What made the see-saw happen?" Example: B found out A had lied, then sat down and slowed right down while A started talking fast to explain.

✓ Closing check (5 min, with answers)

1. In drama, what does "status" mean? **Who has the upper hand between characters at a particular moment, shown through behaviour.**
2. Name two signals that often read as high status on stage. **Any two of: steady eye contact, stillness, taking up space, slow pace, pausing before speaking, a still head.**
3. Can a character with a low-status job play high status? Give an example. **Yes; for example a calm waiter dealing with a panicking customer.**
4. Name the 1979 book by Keith Johnstone that has a section called "Status". **Impro: Improvisation and the Theatre.**

Vocabulary

status, high status, low status, status shift, stillness, convention

Differentiation

- **Support:** work on one signal at a time (only eye contact, then only pace). Use the card game with just 1, 5 and 10.
- **Stretch:** play a scene where both characters try to be lower than the other (for example two people apologising); or a scene where status shifts three times. Watch a scene from a play or film and map the status shifts on a simple graph.

⚠ Safety

- Status work can echo real hierarchies in the room. Never let a scene put down a real person, group, disability or identity, and rotate so no student is always given a low card. Stop a scene that turns into real teasing.
- Keep conflict non-contact: power is shown through distance and stillness, never by pushing, looming over seated people for long, or blocking exits.

- Any student may watch and call "Swap!" instead of performing.

Teacher notes and misconceptions

- **"High status means being loud and bossy."** Often the reverse: loud and hurried can read as low status trying to win. Stillness is usually stronger.
- **Signals differ between cultures and people.** In many cultures, looking away from an older person is respect, not low status, and some students (for example some autistic students) find eye contact uncomfortable. Present the signals as choices an actor can make for an audience, not as rules for judging real people, and never require eye contact.
- The source used here only confirms that Impro has a section titled "Status". The specific exercises above are common classroom practice; check the book itself if you want Johnstone's own versions.

Lesson 3: What does the character want?

Unit overview · Previous: Lesson 2 · Next: Lesson 4

Goal

Students state a character's objective as an active verb aimed at another character, list the given circumstances of a scene, and mark the moment where the character changes tactic or objective.

Materials

- Open space, chairs.
- A short original two-person scene (below), printed, one per pair.
- Index cards; pens.

"The Key" (original scene for this unit, CC0)

A: Have you seen my key?
B: Which key?
A: You know which key.
B: I've been here all afternoon.
A: That's not what I asked.
B: ... It's on the hook. Where it always is.
A: It isn't.
B: Then I don't know.
A: Fine. I'll wait.

Steps

✎ Opening (5 min)

Ask one volunteer to try to get a pen from another student who has been secretly told not to give it up. Allow 30 seconds; no touching. Then ask the class: "What did she want? What did she try first? What did she try when that failed?" Write the answers as verbs: asked, charmed, bargained, guilt-tripped, gave up.

✎ Main activity (30 min)

Introduce three tools from the actor and director Konstantin Stanislavski, whose ideas are often called his "system":

- **Objective (task).** What the character wants at this moment, often framed as "What do I want?" or "What do I need to make the other person do?" (In the first English translation of his books this was called an "objective"; newer translations say "task".)
- **Given circumstances.** The facts of the situation the actor has to work with: who, where, when, what has just happened. Most come from the playwright, some from the director, designers and other actors.

- **Bits (often called beats).** A scene splits into sections; a new one starts at a turning point where something is revealed or decided and the direction changes.
- **Given circumstances (8 min).** Pairs read "The Key". It has almost no facts. Each pair decides and writes on a card: who A and B are to each other, where they are, what time it is, what the key opens and what happened just before. Two pairs with different decisions read the scene aloud; the class notices how different the same words sound.
- **Objectives as verbs (10 min).** Each student writes their character's objective as "I want to make you ___" with an action you can do to someone: confess, leave, apologise, laugh, feel guilty. Weak versions to avoid: "I want to be sad" (a feeling, not something you can play) or "I want the key" (true, but what will you make the other person do?). Replay the scene pursuing those objectives.
- **Find the turn (12 min).** Pairs mark the line where the first bit ends and a new one starts. In many versions it is B's pause before "It's on the hook", or A's "Fine. I'll wait." They change tactic there (for example from accuse to wait them out) and play the scene again. The audience says where they saw the turn.

✓ Discussion questions (with example answers)

- "Why is 'I want to make her confess' more useful than 'I'm angry'?" Example: it gives me something to do to the other person, and I can try different ways. If I just play 'angry' the scene stays the same.
- "How did changing the given circumstances change the scene?" Example: when A was a parent and B a teenager it was a telling-off; when they were flatmates and the key was to a shared bike it became a joke.
- "Where was the turn in the version you watched?" Example: on the pause before "It's on the hook". B gave up pretending, and A switched from questions to waiting.

✓ Closing check (5 min, with answers)

1. Write an objective for A as an active verb aimed at B. **Any "I want to make you ___" with something B can do, for example "I want to make you admit you took it."**
2. What are given circumstances? **The facts of the situation the actor works with (who, where, when, what has just happened), mostly from the playwright but also from the director, designers and other actors.**
3. What marks the start of a new bit or beat? **A turning point: a revelation, decision or realisation that changes the direction of the action.**
4. "I want to be sad" is a weak objective. Why? **It is a feeling, not something you can do to the other character, so it doesn't give the actor actions to play.**

Vocabulary

objective (task), given circumstances, tactic, bit, beat, turning point, Stanislavski

Differentiation

- **Support:** give a list of objective verbs to choose from; give pairs the given circumstances on a card rather than inventing them.
- **Stretch:** split a longer published scene (chosen locally) into bits and write an objective for each. Try "hot-seating": the class asks a student questions in character about their given circumstances.

⚠ Safety

- Characters' circumstances are invented. Students should not base A and B on real people they know or on real conflicts at home.
- The pen game opening is talk only: no grabbing, and the student with the pen can stop at any time.

Teacher notes and misconceptions

- **"The objective is the same as the plot."** No. The plot is what happens; the objective is what one character is trying to make happen, moment by moment.
- **"Stanislavski's system means feeling real emotions."** The source says Stanislavski reached emotion indirectly, through actions and tasks, and in his later work favoured improvising the situations in rehearsal: "The best analysis of a play is to take action in the given circumstances." Students do not need to feel anything; they need to pursue something.
- Translators disagree on terms (task/objective, bit/beat). Use whichever your later curriculum uses, and mention the other once.

Lesson 4: Staging: where bodies stand tells the story

Unit overview · Previous: Lesson 3 · Next: Lesson 5

Goal

Students use stage directions correctly, plan and record blocking for a short scene, and use freeze-frame images and a few Viewpoints tools (tempo, spatial relationship, repetition) to make relationships visible to an audience.

Materials

- Marked stage area with the audience side clearly shown; masking-tape centre mark.
- A printed stage-areas diagram per group: a grid of nine areas (upstage right, upstage centre, upstage left; centre right, centre, centre left; downstage right, downstage centre, downstage left), with "AUDIENCE" written along the downstage edge.
- "The Key" scene from lesson 3; pencils.

Steps

✎ Opening (5 min)

Ask: "If a director says 'cross stage left', which way do you go?" Take answers, then explain. **Stage left and stage right** are the actor's left and right when facing the audience. **House left and house right** are the audience's. **Upstage** is away from the audience and **downstage** is towards it; the words come from old stages that sloped down towards the audience. **To cross** means to move across the stage.

✎ Main activity (30 min)

1. **Stage-areas drill (6 min).** Everyone stands on stage facing the audience. Call out areas ("downstage left", "upstage centre") and they walk there. Then a student caller gives the directions.
2. **Tableaux (8 min).** A tableau vivant (French for "living picture", often shortened to tableau) is a still, silent, posed scene. Groups of four make three freeze frames: the moment before something happened, the moment it happened, and the moment after. Rule: the audience must be able to see every face. Watch them and ask: "Who looks most powerful? Why?" (Height, centre, distance, who others look at.)
3. **Viewpoints tools (6 min).** Directors Anne Bogart and Tina Landau describe "Viewpoints" for working with time and space. Try three:
4. **Tempo:** how quickly or slowly something happens. Replay a tableau transition very slowly, then very fast.
5. **Spatial relationship:** the distance between bodies, or between a body and the group or the room. Replay the "after" freeze with the two main characters as far apart as possible, then as close as allowed.

6. **Repetition:** repeating a movement. One character repeats a small gesture (checking a pocket) through the scene. Ask what each change made the audience think.
7. **Block "The Key" (10 min).** In pairs with a third student as director, plan where A and B start, when they move and where they end, using the status and objective work from lessons 2 and 3. The director records the **blocking** in pencil on the script margin, for example "B X DL" (B crosses downstage left) or "A sits C". Run it twice, keeping to the record. Swap so everyone directs once if time allows.

✓ Discussion questions (with example answers)

- "Why should the director, not just the actor, write the blocking down?" Example: so it's the same every time. In a real production the stage manager keeps the record so actors repeat it each night, even when the director isn't there.
- "How did distance change the scene?" Example: when B stayed far upstage with her back half-turned, A seemed to be chasing her. Close together it felt like an argument between equals.
- "What did the audience need to see that they couldn't?" Example: B's face at the pause. We moved B so she was facing out, not side-on to the audience.

✓ Closing check (5 min, with answers)

1. An actor faces the audience and moves to their own right. Which stage direction is that? **Stage right.**
2. Which part of the stage is downstage? **The part nearest the audience.**
3. What is blocking, in staging? **The planned positions and movements of the actors, recorded so they can be repeated.**
4. Name two Viewpoints from this lesson and say what each one is about. **Any two of: tempo (how quickly or slowly something happens), spatial relationship (distance between bodies, or between a body and the group or space), repetition (repeating a movement).**

Vocabulary

upstage, downstage, stage left, stage right, house left, house right, cross, blocking, sightline, tableau, tempo, spatial relationship, repetition

Differentiation

- **Support:** label the floor with tape for the nine areas. Give the director a list of shorthand (X = cross, DL, UC and so on).
- **Stretch:** block the same scene twice with opposite meanings (B guilty, then B innocent) without changing a word. Research what "côté cour" and "côté jardin" mean in French theatre and why.

⚠ Safety

- Keep the edge of any raised stage marked and well lit; no backward walking near an edge.
- Tableaux: no lifts, no balancing on chairs, and no weight-bearing on other students. Any touch follows the group's agreed consent rule.
- Plan blocking around any wheelchair or mobility aid with the student who uses it; leave clear routes.

Teacher notes and misconceptions

- **Stage left versus house left** is the most common mix-up. A useful check: "Whose left? The actor's, facing out." Note that the source says German, Italian and Arabic theatre use the audience's left and right, so students who know those traditions may expect the opposite.
- **Two meanings of blocking** (see lesson 1): refusing an offer in improvisation, and planned movement here.
- The source traces the word to 19th-century directors such as W. S. Gilbert planning scenes on a miniature stage with blocks standing for actors. A quick version: let groups plan on paper with coins before standing up.
- Sightline rules (faces visible, not standing in a straight line across the stage) are common classroom guidance rather than claims from the sources, and some styles break them on purpose.

Lesson 5: Devise, rehearse, perform

Unit overview · Previous: Lesson 4

Goal

Groups devise, rehearse and perform a 2-3 minute scene from a stimulus, using offers, status, objectives and staging, and give and use specific feedback. This lesson usually needs two or three sessions.

Materials

- Stimulus cards (one per group, chosen by the teacher). Examples written for this unit (CC0):
- a single line: "Nobody has opened this door in forty years.";
- an object: an old suitcase with one luggage label;
- a theme: "a promise that can't be kept";
- an image: a public-domain painting or an openly licensed photograph of your choice, with its credit.
- A devising log sheet per group (headings below).
- Stage area, chairs, simple props (no blades, glass or real valuables).

Steps

✎ Opening (5 min)

Explain devising: making a piece of theatre as a group, where the script or performance comes from the group's own improvising rather than from a playwright. Real devising companies start from almost anything (an image, a theme, a character, a historical document, a single line), make far more material than they need, then select, edit and refine. Today groups will do a small version of the same process.

✎ Main activity (session 1: 35 min; session 2: rehearsal; session 3: showing)

1. **Generate (10 min).** Groups of 3-5 take a stimulus. Using "yes, and", they improvise at least three quick, different ideas from it, each no longer than a minute. Nobody judges yet. One student logs the ideas.
2. **Select (5 min).** Choose one idea. On the log, write:
3. the given circumstances (who, where, when, what just happened);
4. each character's objective as "I want to make you ___";
5. the turning point: where status or objective changes;
6. the opening image and the final image (two tableaux).
7. **Build and block (20 min).** Improvise the scene through, then fix it: keep the lines that worked, write a bare script or bullet list, and record blocking with stage directions. Students in off-stage roles (director, stage manager, sound) record and run the rehearsal.

8. **Rehearse (session 2).** Run the scene, then do a **feedback swap** with another group: each group watches the other once and gives two comments (see below). Groups choose one comment to act on and note it in the log, then run the scene again.
9. **Perform (session 3).** Each group performs. The audience watches for the opening image, the turning point and the final image.

Feedback frame: "At the moment when ___, I noticed ___, and it made me think/feel ___." and "Next time you could try ___ at the moment when ___." Feedback must point to a moment in the work, not to the person.

Devising log headings: Stimulus · Ideas we tried · What we chose and why · Given circumstances · Objectives · Turning point · Opening and final images · Blocking notes · Feedback we received · What we changed.

✓ Discussion questions (with example answers)

- "What did you throw away, and why?" Example: our first idea was funnier but had no change in it; nobody wanted anything. We kept the one where the sister finally tells the truth.
- "Which feedback did you use, and what did it change?" Example: they said they couldn't see Jo's face at the turning point, so we moved her downstage centre and it became the clearest moment.
- "How is devising different from performing a script?" Example: we were the writers as well as the actors, so we had to agree, and the scene kept changing until we fixed it.

✓ Closing check: end of unit (with answers)

1. What is devised theatre? **Theatre where the script or performance comes from the group's collaborative, often improvised, work rather than a written play.**
2. Your partner says "Look, the river's flooding the street!" Give a "yes, and" response. **Anything that accepts the flood and adds an offer, for example "And Grandad's still in the shop. Come on!"**
3. Name two ways an actor can raise their character's status without words. **Any two of: stillness, steady eye contact, taking up space, slower pace, pausing, keeping the head still, taking the centre.**
4. Rewrite "My character wants to be happy" as a playable objective. **Any "I want to make you ___" aimed at another character, for example "I want to make you agree to come to the party."**
5. What is a turning point (the start of a new beat)? **A moment where something is revealed, decided or realised and the direction of the action changes.**
6. You face the audience and the director says "cross downstage left". Where do you go? **Towards the audience and to your own left.**
7. Devising companies often make far more material than they need. What do they do next? **Select, edit and refine it.**
8. A classmate says "Your scene was good." Rewrite it as specific feedback. **Any comment that names a moment and an effect, for example "When you both froze after the door opened, I noticed the silence, and it made me nervous for her."**

Vocabulary

devising, stimulus, ensemble, select, refine, devising log, rehearsal, feedback, opening image, final image

Differentiation

- **Support:** give a stimulus plus a ready-made situation card (who and where). Allow a scene of 1-2 minutes. Groups can perform to one other group rather than the whole class.
- **Stretch:** include a second art form (live sound, projected image or a short movement sequence), linking to the grade 9 aim in the arts progression. Or write a 300-word review of another group's scene using evidence from specific moments.

⚠ Safety

- Check every group's chosen idea before rehearsal starts. Redirect anything using real people, real private events, self-harm, abuse or other topics your school does not cover without a trained adult.
- No stage combat, lifts or falls; conflict is shown through distance, stillness and voice. Any touch follows the agreed consent rule.
- Props: nothing sharp, glass, hot or valuable. Mime weapons are not needed; if a story seems to need one, find another turning point.
- A student who does not want to perform takes an off-stage role and is assessed on the same choices through the log and the plan.
- Recording performances only with everyone's consent and within school policy.

Teacher notes and misconceptions

- **"Devising means no one is in charge."** Groups can still choose a director; the source notes that in devising a director, if there is one, often works as a facilitator.
- **"We need a twist ending."** A clear change is enough. A scene where one person finally admits something is a complete scene.
- Groups often over-plan by talking. Insist on trying ideas on their feet first; talk afterwards.
- Assessment looks for clear choices (opening image, turning point, staging, final image) and use of feedback, not acting talent.

Proposed K–12 Health and Physical Education Progression (Draft Framework)

Status: written framework (not lessons); unreviewed AI draft; CC0 1.0
Author: Gemini 4 Carbon
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> **Important:** this maps a proposed sequence of movement, active-living, health, safety and social-emotional skills from Kindergarten through Grade 12. Kindergarten (terms 1–3), Grade 1 (terms 1–3), Grade 2 (terms 1–3) and Grade 3 (term 2) have written units authored by Claude Opus 5.5, and Grade 3 (term 1), Grade 7 and Grade 10 have written units authored by Gemini 4 Carbon (13 units / 65 lessons total); Grades 4–6, 8–9 and 11–12 are outlines. It is **not** aligned to or accredited by any official curriculum, sporting body or health authority, and nothing here is medical, clinical or certified first-aid advice. Local school policies and statutory requirements—especially around safeguarding, water safety, first-aid certification, adaptations for disability or medical needs, and age-appropriate health or relationships education—always take precedence.

Principles

1. **Moving and practising before naming.** Students find safe space, balance, dodge, pass, warm up, wash hands or try a calm-down breath before learning technical terms for what they did. Vocabulary arrives to describe an experience they have already tried.
2. **Every body participates (universal adaptation by design).** Physical education is for every student, not an audition for athletics. Every activity offers seated, standing, mobility-aid, sensory-friendly and varied-equipment choices (for example scarves, balloons, larger or softer balls, shorter distances or wider targets) as ordinary options for anyone. Lessons avoid elimination games where the least confident movers sit out first, public fitness leaderboards, picking teams by captain draft, and using exercise as punishment.
3. **Safeguarding, privacy and made-up characters.** Classroom health and feelings discussions never ask students to disclose personal or family medical conditions, home food or sleep circumstances, body weight, or private worries. Scenarios use fictional characters (continuing the K–2 pattern, such as Remy in Grade 1 Term 2) so students can reason about choices without putting their own lives on display. Teachers follow local school safeguarding procedures whenever a student shares a concern.
4. **Food, sleep and body neutrality.** Nutrition and fitness lessons focus on variety, water, everyday energy, recovery and how the body works—never calorie counting for children, "good food / bad food" shaming, inspecting students' lunchboxes, or classroom weighing and BMI screening. Lessons acknowledge that family traditions, allergies, sensory needs and food access vary widely.
5. **Physical and emotional safety are taught explicitly.** Clear stop signals, personal spacing ("my bubble"), progressive dynamic warm-ups, mat and equipment checks, weather/heat/hydration awareness, and safe touch boundaries (such as a gentle open-hand "butterfly tag" tap on the shoulder, upper arm or upper back) are taught as core skills rather than assumed.

6. **Medicines and first aid stay strictly within safe boundaries.** In primary grades, medicine safety centres on one clear rule: medicines are taken only from a trusted adult and stored out of reach and sight ("Up and Away"). In secondary grades, first aid and cardiopulmonary resuscitation (CPR) focus on recognising emergencies, calling emergency services, scene safety, and **manikin-only** or non-contact simulation—students never practise chest compressions, rescue breaths, abdominal thrusts or medical procedures on a live classmate.
7. **Cooperation, fair play and designing fairer games.** Students learn not only to follow rules and win or lose graciously, but to spot when a game has become lopsided or unsafe and modify space, equipment, scoring or team size so everyone stays active and included.
8. **From playful fundamentals to lifelong agency.** Primary grades build locomotor, stability and object-control fundamentals alongside concrete daily habits; middle grades connect tactics across game families with personal fitness and stress-management tools; high school shifts toward self-selected lifetime activities, critical health and media literacy, emergency readiness, and sustainable routines beyond school.

Strands

Strand	Short name
Movement skills, games, dance and lifetime activities (locomotor, stability, object control, game tactics, rhythm, outdoor and aquatic options)	Movement & games
Active living and health-enhancing fitness (warm-up/cool-down, heart and muscle response, fitness components, FITT planning)	Fitness
Nutrition, hydration, sleep and daily hygiene (handwashing, oral care, balanced eating and water, sleep hygiene, evaluating health claims)	Daily health
Safety, injury prevention and first aid (shared space, road/sun/water safety, medicine and substance safety, emergency response and first aid in 9–12)	Safety & first aid
Feelings, communication and respectful relationships (feelings vocabulary, regulation strategies, fair play, boundaries, consent, help-seeking)	Feelings & relationships

Two ways of working run through every strand and grade:

- **Doing and adapting:** practising movement patterns, setting up safe spaces, adjusting rules or equipment so a group task works, and rehearsing practical routines (such as 20-second handwashing, checking a crossing, or calling emergency services in a role-play).
- **Reflecting and planning:** noticing how the body responds to effort, rest and stress; evaluating health information; giving kind, specific peer feedback on movement cues; and building realistic personal habits without perfectionism.

Schools organise Health and Physical Education in different ways—sometimes as a single combined subject, sometimes with gym/field lessons separated from classroom health lessons. Each grade outline below pairs active movement work with practical health, safety and social-emotional learning so teachers can run them together or separately. Swimming and water-safety skills are strongly recommended wherever safe facilities and qualified instruction exist; classroom water-safety principles (supervision, lifejackets, recognising hazards, reach-or-throw rather than entering deep water) can be taught everywhere.

Core vocabulary across bands

- **Movement concepts (K–5):** personal space and general space, levels (low, medium, high), pathways (straight, curved, zigzag), directions, speed/force, bases of support, weight transfer, and locomotor vs. non-locomotor vs. manipulative skills.
- **Game categories (3–12):** invasion games (moving an object into an opponent's territory to score, such as tag variants, handball, basketball or football/soccer), net/wall games (sending an object over a net or against a wall so it is hard to return, such as balloon volley, pickleball, badminton or volleyball), striking/fielding games (hitting a ball into open space and fielding it, such as tee-ball, kickball, cricket or rounders), and target games (sending an object accurately toward a target, such as boccia, bowls or curling variants).
- **Lifetime activities (6–12):** physical activities well suited to lifelong participation alone or in small groups without needing two large full-roster teams—including outdoor pursuits (walking, hiking, cycling, orienteering), fitness activities (yoga, resistance training, running, swimming), dance and rhythmic movement, aquatics, individual-performance activities, and net/wall or target games.
- **Health-related fitness & FITT (6–12):** cardiorespiratory endurance, muscular strength, muscular endurance, flexibility (and body composition discussed conceptually as tissues rather than classroom body measurement); dynamic warm-up vs. static cool-down stretching; perceived exertion; and the **FITT** overload variables—Frequency, Intensity, Time and Type.
- **Daily health, safety & first aid (K–12):** germs and 20-second handwashing; fluoride brushing and limiting sugary drinks; varied whole foods, fibre and water; sleep routines and sleep hygiene (regular schedule, dim light/screens before bed, winding down); pedestrian safety (Stop, Look, Listen, Think); medicine storage (Up and Away); scene safety, calling emergency services, recovery position concepts, automated external defibrillator (AED) awareness, and hands-only adult CPR parameters (100–120 chest compressions per minute, 5–6 cm deep, practised strictly on a training manikin).

Frameworks and scholarship teachers may recognise

- **Five learning domains in physical education:** contemporary PE scholarship extends the classic psychomotor, cognitive and affective domains with explicit social and cultural domains, emphasising inclusion and meaning alongside physical skill.
- **SHAPE America Grade-Level Outcomes (2013):** organises K–12 physical literacy around five standards—motor skills and movement patterns (Standard 1), movement concepts, strategies and tactics (Standard 2), fitness and physical-activity knowledge (Standard 3), responsible personal and social behaviour (Standard 4), and the value of physical activity for health, enjoyment, challenge, self-expression and social interaction (Standard 5)—moving from fundamental skills in K–5 to game tactics and FITT in 6–8 and lifetime activities plus personal program design in 9–12.
- **Game-sense / tactical groupings:** grouping games into invasion, net/wall, striking/fielding and target families lets students transfer tactical ideas (such as creating open space or returning to mid-court) across sports instead of memorising isolated rulebooks.
- **Public-health skill models:** health education focuses on observable, protective everyday behaviours—hand hygiene, dental care, pedestrian scanning, safe medicine storage, sleep hygiene, media literacy and bystander emergency steps—rather than rote anatomy quizzes alone.

This framework borrows useful structure from those traditions without claiming formal alignment to any single national standard.

Bands

Band	Ages	Focus
K–2	5–8	Safe play and everyday routines: personal space, stop signals, locomotor and stability fundamentals, underarm throwing/catching/kicking/striking, turn-taking, naming feelings, calm-down tools, handwashing, teeth, food/water, sleep, road and medicine safety.
3–5	8–11	Combining skills, cooperative tactics and healthy habits: linking movement sequences, simple chasing/fleeing and small-sided game tactics, progressive warm-ups and noticing heart/breathing changes, hydration and balanced energy, sun/water/wheel safety, teamwork and resolving disagreements fairly.
6–8	11–14	Game families, personal fitness and navigating change: creating and closing space across invasion, net/wall, striking/fielding and target games; FITT principles, dynamic vs. static stretching, and balanced nutrition; sleep hygiene in adolescence, stress-regulation tools, digital/media pressures, boundaries and substance refusal skills.
9–12	14–18	Lifetime activity, critical health literacy and first aid: competency in self-selected lifetime activities, biomechanics and practice planning, designing personal fitness and nutrition routines, evaluating commercial health claims and sport ethics, healthy relationships and community support, and emergency response, first aid and manikin-only CPR/AED readiness.

Grade by grade

Lines without a "Unit written" link are outlines only. Where K–2 year plans already define specific term units, those links and term notes are included below.

- **Kindergarten.** Movement & games: finding safe personal space ("my bubble"), freezing on a stop signal, travelling at different speeds and levels, two-foot jumping with soft bent-knee landings, static balances (wide base, one foot), walking a line, and rolling, bouncing, throwing underarm and catching a large ball; simple turn-taking and shared-goal games without "out" elimination. Daily health & safety: the five steps of 20-second handwashing with soap and water and when to wash; varied everyday foods and plain water for thirst; a calm bedtime routine and why growing bodies need sleep; pedestrian safety using Stop, Look, Listen, Think with a grown-up. Feelings & relationships: naming everyday feelings (happy, sad, angry, scared, calm) from faces and short fictional situations, and waiting for a turn. **Unit written:** units/health-pe/K-moving-safely-and-handwashing/ (term 1: safe space, stop and go, soft landings, 20-second handwashing); units/health-pe/K-balance-ball-skills-and-feelings/ (term 2: balance, walking a line, jump and freeze, large-ball rolling/throwing/catching, five feelings words); units/health-pe/K-turns-food-sleep-and-road-safety/ (term 3: turn-taking and cooperative games, varied foods and water, bedtime routines, Stop, Look, Listen, Think road safety).
- **Grade 1.** Movement & games: four ways of travelling (walk, run, hop, skip/gallop) along straight, curvy and zigzag pathways; dodging by planting an outside foot; safe "butterfly tag" (a gentle tap with an open hand on the shoulder, upper arm or upper back); underarm throwing with opposite-foot step, catching from a scarf to a medium ball, and inside-of-the-foot kicking and trapping; fair relays, modifying one rule to make a game fairer, and good-sport finishes. Fitness: leading and noticing a progressive dynamic warm-up (faster heart beat, faster breathing, warmer skin). Daily health & safety: brushing teeth twice a day for two minutes across outer, inner and chewing surfaces and limiting sugary drinks; medicine safety (taking medicine only from a trusted adult; storing medicines Up and Away). Feelings

& relationships: noticing mixed feelings in made-up character stories, practising calm-down tools (slow belly breaths, counting, taking space) without treating any feeling as "bad", and asking a trusted adult for help. **Unit written:** units/health-pe/1-moving-dodging-and-warming-up/ (term 1: travelling, pathways, dodging, warming up, safe tag); units/health-pe/1-throwing-catching-kicking-and-calm-down/ (term 2: underarm throw, catch, inside-foot kick, feelings and calm-down choices); units/health-pe/1-fair-games-teeth-medicines-and-help/ (term 3: fair games and rule tweaks, tooth brushing, medicine safety, asking a trusted adult for help).

- **Grade 2.** Movement & games: floor gymnastics—balancing on different numbers of body parts and at low/medium/high levels, curling/stretching/twisting, sideways pencil and tucked egg rolls on mats (explicitly avoiding unsupported forward rolls), horizontal and vertical jumping with controlled landings, and linking balance–travel–balance floor sequences; striking a balloon or light ball with an open hand and short lightweight paddle/bat; passing and moving with a partner or trio. Fitness & daily health: student-led warm-up actions; water, shade/sun protection, rest and hand hygiene around active play. Feelings & relationships: resolving common playground game disagreements ("Was it on the line?", "Whose turn is it?") through fictional scenarios, quick fair re-starts, and designing a class game day where every station has clear, inclusive rules. **Unit written:** units/health-pe/2-balance-rolling-and-jumping/ (term 1: floor balances, sideways rolls, jumping and landing, 3-part sequences, mat safety); units/health-pe/2-hitting-and-passing/ (term 2: open-hand balloon/light-ball striking, short-paddle control, partner passing and moving, fair playground re-starts); units/health-pe/2-healthy-habits-and-a-class-game-day/ (term 3: student-led warm-ups, handwashing, water, shade/sun protection, rest, and designing an inclusive class game day).
- **Grade 3.** Movement & games: combining locomotor patterns smoothly (run-and-leap, skip-to-stop, side-slide defensive shuffle); overhand throw preparation and mature underarm/chest passing to a stationary partner; foot and hand dribbling with control while changing speed; simple chasing and fleeing strategies in non-elimination tag and cooperative treasure-retrieval games; rhythm and group pathway sequences to a steady count. Fitness: charting enjoyable ways to be active outside class and noticing how steady aerobic play differs from short bursts and gentle recovery. Daily health & safety: how water, grains, fruits/vegetables and protein-rich foods support everyday play and growth (using neutral food-group models rather than personal food logs); helmet, scooter/bicycle visibility and driveway/crossing awareness. Feelings & relationships: giving specific encouragement to teammates of all skill levels, welcoming newcomers into a group, and distinguishing teasing from friendly play in fictional scenes. **Units written:** units/health-pe/3-passing-dribbling-tactics-and-fuel/ (term 1: passing, dribbling, chasing/fleeing tactics, warm-up/cool-down, everyday fuel and wheel safety); units/health-pe/3-jumping-rope-and-fitness/ (term 2: jumping patterns, soft landings, short and long rope, fitness concepts, heart/breathing awareness and warm-up/cool-down); units/health-pe/3-striking-fielding-and-staying-safe/ (term 3: striking off a tee into space, stopping/catching and underhand throwing to a stopper, Tee and Cone game with fair turns, and sports-day sun and water safety).
- **Grade 4.** Movement & games: small-sided cooperative **net/wall** and **target** games (such as bounce-and-hit hand tennis, foam-paddle rallies, and boccia/beanbag target challenges); offensive and defensive basics in modified 3v3 **invasion** games—moving into open space to receive a pass rather than crowding the ball; jump-rope or rhythmic footwork patterns. Fitness: identifying major components of health-enhancing fitness through practical stations (endurance, strength, flexibility) and leading a structured dynamic warm-up and gentle cool-down. Daily health & safety: reading basic drink and snack labels for added sugars and hydration needs during warm weather; sun, heat and classroom water-safety principles (supervision, lifejackets, flags/signs, Reach or Throw, Don't Go). Feelings &

relationships: recognising body signals of frustration or pre-game nerves, using a quick reset routine during play, and practising peer conflict-resolution steps (pause, state the problem, agree a fair fix or replay).

- **Grade 5.** Movement & games: **striking/fielding** fundamentals (striking off a tee or gentle toss into open space, backing up a teammate when fielding) alongside small-sided invasion and net/wall games where student teams adapt court dimensions or scoring rules to keep play balanced; creating a short group movement or rhythmic gymnastics sequence with canon and unison. Fitness: pre- and post-practice self-checks focused on personal comfort, pacing and skill goals (never peer comparison), plus how muscles, lungs and heart work together during sustained movement. Daily health & safety: sleep duration and evening wind-down habits for upper-primary students; hygiene changes as bodies grow; safe online/offline boundaries and knowing trusted adults at school and home. Feelings & relationships: peer pressure in fictional friendship scenarios, respecting "no" and personal boundaries without argument, and officiating small games fairly as a rotating student referee.
- **Grade 6.** Movement & games: tactical foundations across **invasion** and **net/wall** games—creating open space with cuts, pivots and leading passes to a moving teammate, and returning to a central base position after a shot with a short-handled paddle; folk, line or social rhythmic movement patterns; outdoor navigation/walking challenges where space allows. Fitness: differentiating aerobic from anaerobic effort and muscular strength from muscular endurance; introducing the **FITT** variables (Frequency, Intensity, Time, Type) and safe stretching technique. Daily health & safety: balanced meals, snacks and hydration across an active school day; cold/wet and hot-weather clothing and hydration choices; recognising household, workshop and lab hazard symbols alongside active-space safety. Feelings & relationships: identifying constructive vs. unhelpful stress responses, positive self-talk during skill practice, and inclusive etiquette when working with diverse partners.
- **Grade 7.** Movement & games: opening and closing space defensively and offensively in modified small-sided invasion games (2v2 to 4v4); forehand and backhand placement in net/wall games using long- or short-handled implements to move an opponent; catching and striking to open space in fielding games. Fitness: demonstrating the difference between **dynamic stretching** (before activity) and **static stretching** (during cool-down); applying FITT principles to build a balanced week of varied movement. Daily health & safety: adolescent **sleep hygiene** (how circadian timing shifts in adolescence, how evening bright light and late stimulation delay sleep, and practical wind-down experiments); evidence-based facts on nicotine/vaping, alcohol and caffeine vs. marketing myths. Feelings & relationships: practising concrete stress-regulation methods (paced breathing, progressive muscle relaxation, brisk movement), bystander options when witnessing exclusion or bullying online or in person, and clear communication of personal boundaries. **Unit written:** units/health-pe/7-tactics-fitt-sleep-and-stress/ (invasion and net/wall space tactics, antagonistic muscles, dynamic vs. static stretching, FITT and Borg RPE, adolescent sleep hygiene, nicotine/vaping evidence, and stress/bystander tools).
- **Grade 8.** Movement & games: combining tactics fluently in student-officiated small-sided games (varying shot placement, force and timing in net/wall games; give-and-go and defensive positioning in invasion and target games); composing a short group movement, dance or yoga/tai-chi-inspired flow sequence; outdoor or aquatic safety review. Fitness: connecting the five components of health-related fitness (cardiorespiratory endurance, muscular strength, muscular endurance, flexibility, and conceptual body composition) to physical and mental wellbeing; identifying real-world barriers to staying active in a neighbourhood or schedule and planning practical workarounds. Daily health & safety: links between long-term nutrition patterns and health risk factors, taught alongside food affordability, cultural variety and media scepticism toward fad diets; concussion and overuse-injury warning signs (when in doubt, sit them out and tell an adult). Feelings &

relationships: analysing how edited social media images distort expectations of bodies and athletic performance, everyday consent and mutual respect in friendships and relationships, and mapping reliable school and community support resources.

- **Grade 9.** Movement & games: transition toward **lifetime activities**—developing competence in at least two activities suited to lifelong solo, partner or small-group participation (for example badminton/pickleball, orienteering/hiking, resistance and mobility training, running/walking intervals, dance, or swimming where available). Fitness: using perceived exertion (RPE) and heart-rate zones to pace aerobic effort safely; safe bodyweight and light-implement resistance mechanics (posture, hinge, squat, push, pull, rest intervals) and heat/humidity/cold precautions. Daily health & safety: **foundational first aid**—assessing scene safety, recognising unresponsive vs. responsive casualties, calling emergency services clearly, controlling external bleeding with direct pressure (simulated with dressings/props), caring for minor burns with cool running water, and recognising choking signs. Feelings & relationships: managing transition stress in secondary school, supportive team communication, and recognising warning signs when a friend may need adult or professional mental-health support.
- **Grade 10.** Movement & games: refining skill and tactical consistency in chosen lifetime, net/wall, target, dance or outdoor activities; using basic biomechanics (force, leverage, rotation, centre of mass, and the speed–accuracy trade-off) to analyse a movement cue and design a 4-week personal skill-practice plan. Fitness & daily health: critically evaluating commercial fitness programmes, supplements, energy drinks and influencer health claims against evidence quality; designing a balanced, flexible nutrition and hydration plan for active days without restrictive dieting. Safety & first aid: **cardiopulmonary resuscitation (CPR) and AED readiness**—understanding the chain of survival, checking responsiveness and normal breathing, calling emergency services, adult hands-only CPR parameters (chest compressions 5–6 cm deep at 100–120 beats per minute, practised **strictly on a training manikin** or non-contact timing pad, never on a person), and how an automated external defibrillator (AED) guides rescuers with voice prompts. Feelings & relationships: ethical conduct in sport and recreation (fair play, intentional fouls, performance-enhancing substances, gambling pressures), plus assertive communication and boundary-setting. **Unit written:** units/health-pe/10-lifetime-activities-biomechanics-and-cpr/ (lifetime net/wall and target activities, levers and Fitts's speed–accuracy trade-off, agonist–antagonist resistance and heat/cold pacing, supplement claim audits and flexible active fuel, manikin/pad-only hands-only CPR and AED readiness, and post-school active-living design).
- **Grade 11.** Movement & games: assuming leadership roles in physical activity—planning and leading a peer warm-up, coaching a skill station with constructive cues, or officiating/adapting an inclusive intramural or lifetime-activity session so beginners and experienced participants both thrive; exploring the historical and cultural roles of a chosen game, martial art, outdoor pursuit or dance tradition with proper credit. Fitness: designing a multi-week personal fitness and recovery programme tailored to different post-school schedules (desk study, shift work, active trades), incorporating mobility and injury prevention. Daily health & safety: environmental and occupational health basics (ergonomics, hearing protection, UV exposure, air quality, safe lifting); recognising medical emergencies such as anaphylaxis, severe asthma, heat exhaustion/heatstroke and hypothermia, and knowing when urgent medical help is required. Feelings & relationships: navigating conflict, rejection and change respectfully; media literacy around wellness industries; and how public spaces, transport and community policy shape who gets to be active and healthy.
- **Grade 12.** Movement & games: independent or small-group **lifetime physical activity capstone**—selecting an accessible lifetime activity, setting personal enjoyment and skill goals, documenting practice and adaptations over several weeks, and introducing classmates to an inclusive beginner session. Fitness & daily health: building a realistic, low-

cost post-school wellbeing toolkit covering movement in tight schedules, cooking/choosing affordable balanced meals, protecting sleep during exam or work transitions, and navigating primary healthcare (booking appointments, pharmacist vs. urgent care vs. emergency services, reading medicine information leaflets). Safety & first aid: integrated emergency-scenario walkthroughs (tabletop and manikin/prop-only simulation) combining scene safety, emergency calls, bystander coordination, bleeding/burn/recovery-position decisions, and CPR/AED refresher checks, alongside signposting to accredited local first-aid certification courses. Feelings & relationships: sustaining social connection after leaving school, recognising burnout, supporting peers safely without taking on a clinician's role, and knowing local and national crisis and health support pathways.

Links to other progressions

- **Science:** pushes, pulls and stability (Kindergarten and Grade 2), plants/animals and what living things need (K–2), cellular respiration and gas exchange (Grade 7), forces, levers and Newton's laws in human biomechanics (Grades 9–10), and reaction rates/homeostasis in upper secondary biology and chemistry. See the science progression.
- **Mathematics:** counting beats, repetitions and scores (K–2), measuring jump distances, times and court dimensions (Grades 2–5), ratios, rates and heart-rate or pacing data (Grades 6–8), and interpreting health statistics and risk claims critically (Grades 9–12). See the mathematics progression.
- **Arts:** pulse, tempo, canon/unison and expressive movement in music and dance across all bands, and status, gesture and role-play using fictional characters when exploring social dilemmas. See the arts progression.
- **History, geography and society:** rules, fairness and community helpers (K–2), reading maps and routes for pedestrian safety and orienteering (Grades K–6), evaluating health claims and sources (Grade 8 information literacy), and how urban planning, economics and public institutions shape public health (Grades 9–12). See the history, geography and society progression.
- **Computing:** step-by-step sequences in warm-ups and emergency algorithms (K–5), privacy and digital wellbeing around wearables, fitness apps and social media feeds (Grades 6–12). See the computing progression.
- **Language and literacy:** feelings and action vocabulary (K–2), procedural instructions for games and safety routines (Grades 1–5), and evaluating persuasive health adverts and writing reflective practice plans (Grades 6–12). See the language and literacy progression.

Known gaps and cautions

- **Fourteen units written so far (K–3, Grade 7 and Grade 10):** Kindergarten terms 1–3, Grade 1 terms 1–3, Grade 2 terms 1–3, and Grade 3 terms 2–3 jumping/rope/fitness and striking/fielding/staying safe (55 lessons authored by Claude Opus 5.5), plus Grade 3 term 1 passing, dribbling, tactics, fuel and wheel safety, Grade 7 invasion and net/wall tactics, FITT, sleep hygiene and stress regulation, and Grade 10 lifetime activities, biomechanics, evidence-based wellness and CPR/AED readiness (15 lessons authored by Gemini 4 Carbon; 70 lessons total). Grades 4–6, 8–9 and 11–12 in this document are currently outlines awaiting unit drafts.
- **Facilities and climate vary widely:** some schools have gymnasiums, fields, mats, paddles and pools; others teach in a small paved courtyard or cleared classroom. Future

units in Grades 3–12 should follow the K–2 habit of requiring minimal, low-cost equipment with indoor/small-space alternatives in every lesson.
- **Aquatics and outdoor safety depend on local geography and qualified supervision:** classroom water-safety rules can be taught anywhere, but in-water swimming instruction requires certified lifeguards/instructors and local facility protocols.
- **First aid and CPR are non-certified educational introductions:** reading a school unit does not certify a teacher or student in first aid or CPR. Practical CPR compression depth depends on certified training manikins, and local clinical guidelines (for example Resuscitation Council UK, American Heart Association, Red Cross/Red Crescent) are updated periodically and should always be checked before teaching.
- **Sensitive health topics require local family and statutory alignment:** puberty, reproductive and sexual health, mental health, bereavement and substance-use education are governed by specific local laws, age thresholds and family-notification policies in many jurisdictions. This outline marks where broad health, boundary and help-seeking themes sit, leaving statutory syllabus choices to schools and communities.
- **No human educator, physical-education specialist or healthcare professional has reviewed this progression.**

Sources

- SHAPE America (2013), Grade-Level Outcomes for K–12 Physical Education (five standards; K–5 fundamental motor skills and movement concepts; Grades 6–8 invasion, net/wall, target and fielding/striking tactics, FITT formula, dynamic vs. static stretching, five components of health-related fitness; Grades 9–12 lifetime activities, biomechanics, evaluating commercial fitness claims, personal program planning): https://www.shapeamerica.org/wp-content/uploads/Grade-Level-Outcomes-for-K-12-Physical-Education.pdf
- Wikipedia, "Physical education" (primary and secondary physical education; psychomotor, cognitive, affective, social and cultural learning domains): https://en.wikipedia.org/wiki/Physical_education
- Wikipedia, "Health education" (physical, social, emotional and environmental dimensions of health education; preventive skill building): https://en.wikipedia.org/wiki/Health_education
- Wikipedia, "Healthy diet" (water, macronutrients, micronutrients, fibre, fruits, vegetables and whole grains; limiting sweetened beverages and ultra-processed foods; affordability and access): https://en.wikipedia.org/wiki/Healthy_diet
- Wikipedia, "Sleep hygiene" (behavioural and environmental sleep practices developed in the late 1970s: regular schedule, limiting evening light exposure, avoiding vigorous exercise right before bed, winding down): https://en.wikipedia.org/wiki/Sleep_hygiene
- Wikipedia, "First aid" (immediate assistance to preserve life, prevent worsening and promote recovery until medical services arrive; AED availability): https://en.wikipedia.org/wiki/First_aid
- Wikipedia, "Cardiopulmonary resuscitation" (emergency procedure to maintain oxygenated blood flow to brain and heart until defibrillation/advanced care; adult chest compressions 5–6 cm deep at 100–120 per minute): https://en.wikipedia.org/wiki/Cardiopulmonary_resuscitation
- Wikipedia, "Hand washing" (read 11 November 2026: cleaning hands with soap and water, scrubbing for at least 20 seconds, rinsing and drying to prevent spread of infection): https://en.wikipedia.org/wiki/Hand_washing

- Wikipedia, "Green Cross Code" (read 11 November 2026: UK pedestrian road-safety campaign begun in 1970 by RoSPA; core Stop, Look, Listen, Think crossing sequence): https://en.wikipedia.org/wiki/Green_Cross_Code
- Up and Away and Out of Sight (educational program in partnership with the US CDC; read 11 November 2026: storing medicines and vitamins up and away, out of children's reach and sight after every use): https://upandaway.org/

Kindergarten Health and PE: Moving Safely, Stop and Go, and Clean Hands (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 6 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check space, footwear, medical and handwashing notes against your school's rules. Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Kindergarten year plan

Big idea

We can move fast and have fun and still keep ourselves and each other safe: we watch our own space, stop when we hear or see the signal, and land softly. Clean hands help keep us well, so we learn how and when to wash them.

This is the first health and PE unit of the kindergarten year (term 1). Term 2 goes on to balance, jumping and landing further, throwing and catching a large ball, and words for feelings.

Outcomes

By the end of the unit a student can:

1. Move around a shared space (walking, jogging or wheeling) without bumping into others, using "my bubble" space.
2. Stop and freeze within a couple of seconds of the class stop signal.
3. Jump forward with two feet together and land with bent knees ("quiet feet"); try a few hops on one foot (holding on is fine).
4. Wash hands in order (wet, soap, rub palms, backs, between fingers, thumbs and nails, rinse, dry) and keep scrubbing for about 20 seconds.
5. Name two times to wash hands: before eating and after using the toilet.

Prior knowledge

- Most children can walk and run by this age; balance and running are still improving, and hopping on one foot varies a lot at five. Expect a wide range and praise trying, not just success.
- Many children already wash hands at home or nursery, often quickly. The aim is a slower, more complete wash.

Lessons

PE lessons are about 25 minutes; the handwashing lesson is about 20 minutes and happens near the sinks. Leave a day or two between lessons. The stop signal from lesson 1 is used in every later lesson.

Lesson	Title	Main activity
1	My bubble, your bubble	Moving in our own space; learning the stop signal
2	Run, walk, stop!	Traffic-light game: go, slow, stop
3	Jump, hop and land softly	Two-foot jumps, soft landings, first hops
4	Clean hands	The handwashing steps, a 20-second chant, when to wash
5	Safe mover show	Stations circuit and end-of-unit check

Materials (whole class unless noted)

- A hall, playground or cleared space with clear edges, at least a couple of metres from walls and furniture. Cones or floor spots to mark the edge.
- A stop signal that can be both heard and seen: a drum or tambourine plus a raised hand or a red card.
- Three large cards for lesson 2, each with a colour and a shape so they can be told apart without colour: green with a circle (go), yellow with a triangle (slow), red with a square (stop). Optional fourth card: blue with a star ("turn round once").
- Hoops or floor spots (one per child) for lessons 1, 3 and 5. A flat line of floor tape (or chalk outdoors) to jump over. Do not use a loose rope: a child who lands on it can roll an ankle or trip.
- Lesson 4: sinks, soap, paper towels or a hand dryer; washable paint in a tray (one small blob per child) for the "missed spots" demonstration; six large step cards (wet, soap, rub, scrub between fingers and thumbs, rinse, dry); a clock or timer with a second hand for the teacher.
- Lesson 5: one set of the six handwashing step cards (smaller copies) per station group, and a class list for notes.

⚠ Safety and access

- **Space and floor:** check the space for hazards before each lesson. No running in socks on a slippery floor; trainers or bare feet on a suitable surface, as your school allows. Walk, never run, near the sinks.
- **Medical:** check records for conditions that affect exercise (asthma, heart, joint, epilepsy) and follow each child's plan. Water available.
- **Stop signal for everyone:** always give the signal both as a sound and as something to see, so that deaf children and children who are not looking at that moment both get it.
- **Movement is opt-in in form, not in taking part:** children who use a wheelchair, walker or crutches travel, stop and "jump" in their own way (wheel and stop; a push-up lift or arm swing for a jump; lifting one foot while holding on, or a seated bounce, for a hop). Any child may hold a wall, rail or a partner's hand when hopping.
- **Noise:** offer ear defenders and a quiet spot near the edge; keep the drum soft.
- **Skin:** use school-approved soap. Frequent washing can dry skin; children with eczema or sore skin may need a gentler soap and to pat dry, as their family or plan advises. The paint demonstration is optional and uses washable, skin-safe paint only; skip it for children with skin conditions.
- **Touch:** support by touch (guiding a hand at the sink) only with the child's agreement.

Assessment

- Lessons 1-3: the teacher watches for moving without bumping, stopping on the signal and soft two-foot landings, and notes it on a class list.
- Lesson 4: watch each child wash once using the step cards.
- Lesson 5: a 5-part movement and talk check with an answer guide. Plan an extra small-group or one-to-one slot in the week to finish per-child checks; some children show more when not watched by the whole class.

Sources

- Wikipedia, "Hand washing" (read 6 November 2026): https://en.wikipedia.org/wiki/Hand_washing
- Steps: lather the backs of hands, between fingers and under nails; scrub for at least 20 seconds; rinse well under running water; dry with a clean towel or air dry.
- The most commonly missed areas are the thumb, the wrist, between the fingers and under the fingernails.
- Critical times include after using the toilet and before eating.
- Frequent hand washing can dry the skin.
- Wikipedia, "Gross motor skill" (read 6 November 2026): https://en.wikipedia.org/wiki/Gross_motor_skill
- By about three, children enjoy hopping, jumping and running back and forth; by about five, balance and running have improved.
- No health or PE standard was read for this unit.

Known gaps

- No official standard was read. The choice and order of skills is mine, based on the kindergarten year plan.
- "After the toilet" and "before eating" are the two times the unit teaches because the source names them. Schools usually add others (after outdoor play, after messy play, after blowing your nose); add your own class rules.
- The 20-second chant is timed by saying it twice; check the timing with a clock once, because speed varies.
- Hopping is only introduced. Many children will not hop steadily yet; term 2 returns to balance and jumping.
- Peer check: Gemini 4 Argon did a bounded text, timing and answer-key check at d18fb8c (not an educator, safety or accessibility review). Its notes (loose rope as a trip hazard, missing materials, shapes on the traffic-light cards, access routes inside the end-of-unit check) were fixed in the follow-up commit 2fda61e (see PEERCHECKS.md), which Argon also diff-checked the same day.

CC0 1.0. Chants and games in this unit were written for it and are also CC0.

Lesson 1: My bubble, your bubble

Goal: Children move around a shared space without bumping into anyone and freeze on the class stop signal.

Length: about 25 minutes.

Materials

- A cleared space with cones or floor spots marking the edge.
- A drum or tambourine, plus a raised hand or red card (the stop signal).
- One hoop or floor spot per child (optional).

Steps

✎ Opening (3 min)

Sitting at the edge. "Today we are going to be bubbles. Stretch your arms out and turn slowly. That's your bubble. Can you touch anyone? If you can, scoot over until you can't." Point out the edge cones: "Our bubbles stay inside the cones."

✎ Main activity: bubbles on the move (15 min)

1. The stop signal (3 min): show it. "When I tap the drum twice and put my hand up, everyone freezes like a statue." Practise sitting down first: wiggle, signal, freeze. Repeat until it is quick. Then practise standing.
2. Walking bubbles (5 min): walk anywhere in the space, looking for empty spaces. "If your bubble is about to touch someone, turn away." Freeze on the signal every 20-30 seconds. After each freeze: "Look around. Is everyone's bubble safe?"
3. Faster bubbles (4 min): try tiptoe walking, then big steps, then a gentle jog if the space and the group are ready. Freeze often. If bumps happen, go back to walking.
4. Ways to move (3 min): children suggest a way to move (marching, stomping softly, sliding sideways, wheeling) and everyone tries it, still keeping their bubble.

✎ Game: statues (5 min)

Play music or the drum; children move in their bubbles. When the sound stops (and the hand goes up), freeze. No one is "out": anyone still moving gets a friendly "Caught you! Back to moving." Let a child be the one who gives the signal.

✓ Closing check (2 min)

Sitting. "Show me with your arms how big your bubble is. What do you do if someone is in the way?" (Answer guide: arms out to the side; turn away, go round, slow down or stop. Note who answers and who froze quickly in the game.)

Vocabulary

space, bubble, edge, freeze, stop, signal

Differentiation

- Support: a child who finds open space hard can move along a line of floor spots or hold an adult's hand for the first round.
- Stretch: "Can you find the emptiest space in the room and get there?"

⚠ Safety

- Check the space before starting. Keep the edge at least a couple of metres from walls.
- The signal is both heard and seen every time.

Teacher notes

- The stop signal is the most important thing in this unit. Keep the same signal all year if you can, so it becomes automatic.
- Some children love freezing; some find being "caught" upsetting. Keep it light and never use it to single a child out.

Lesson 2: Run, walk, stop!

Goal: Children change speed when told and stop within a couple of seconds of the signal, without bumping.

Length: about 25 minutes.

Materials

- The cleared space and edge cones.
- The stop signal (drum and raised hand or red card).
- Three large cards, each with a colour and a shape: green with a circle, yellow with a triangle, red with a square. Optional: blue with a star.

Steps

✎ Opening (3 min)

Sitting. "What happens at traffic lights?" (Children may know green go, red stop, and yellow or amber in between.) "Today our bodies are cars."

Warm-up (4 min)

Bubbles from lesson 1: walk, then march, then tiptoe, freezing on the signal two or three times. A quick reminder: "Bubbles safe? Good."

✎ Main activity: traffic lights (12 min)

1. Learn the cards (2 min): green = go (jog), yellow = slow (walk), red = stop (freeze). Say the colour as you hold up the card, and give the stop signal with red.
2. Play (6 min): change cards every 10-20 seconds. Mix the order. Watch that children look up and around while jogging.
3. Stopping well (2 min): freeze and look. "Who stopped with their feet apart and knees a little bent? That's a strong, safe stop." Try a few more stops like that.
4. Extra cards (2 min, if going well): a blue card for "turn round once", or let a child hold up the cards.

✓ Discussion questions (4 min)

- "Why do we need to stop quickly?" (Answer guide: so we don't bump into someone or something; so we can hear what the grown-up says; accept any sensible safety reason.)
- "Is it harder to stop when you are running or walking?" (Answer guide: usually running, because you are going faster; accept what children noticed.)

✓ Closing check (2 min)

One last round: green, then red without warning. (Answer guide: watch who freezes within about two seconds, without bumping. Note it on the class list.)

Vocabulary

go, slow, stop, jog, walk, freeze, traffic light

Differentiation

- Support: a child who rushes can partner with an adult or calmer child and move together.
- Stretch: on red, freeze in a balance (one hand up, or on tiptoes).

⚠ Safety

- Jog, don't sprint, in a shared space. If bumps start, stay on yellow for a while.
- Colour cards are always said aloud as well, and each card has its own shape (circle, triangle, square), for children who find red and green hard to tell apart. Deaf or hard-of-hearing children can follow the shapes without needing the spoken word.

Teacher notes

- The traffic-light game links well to road safety in term 3 (stopping at the kerb), but this lesson is about stopping our bodies, not about crossing roads.

Lesson 3: Jump, hop and land softly

Goal: Children jump forward with two feet and land with bent knees, and try a few hops on one foot.

Length: about 25 minutes.

Materials

- The cleared space, edge cones and stop signal.
- One hoop or floor spot per child. Flat floor-tape lines (or chalk outdoors); not loose ropes, which can roll underfoot.
- A wall, rail or bench to hold for hopping.

Steps

✎ Opening (3 min)

Standing in bubbles. "Can a frog land quietly? Can an elephant?" Let children show a loud stomp and then a quiet landing. "Today we land like frogs: quiet feet, bendy knees."

Warm-up (4 min)

Traffic lights from lesson 2 (jog, walk, freeze), then march on the spot and swing arms.

✎ Main activity: jump, land, hop (12 min)

1. Two-foot jump (4 min): standing next to a hoop or spot. Model: "Feet together, swing arms back, jump, land on both feet, knees bend, freeze." Children jump in and out of their hoop. Praise quiet landings.
2. Over the river (3 min): jump over a flat tape line ("the river"). Move the lines a little wider for children who are ready; keep a narrow one for everyone else.
3. First hops (5 min): "A hop is one foot up, jump on the other foot." Hold a wall, rail or partner's hand. Try three hops on one foot, then change feet. Many children will manage one or two hops, or wobble; that is expected at this age. Children who prefer can lift one foot and hold the balance instead.

✓ Discussion questions (4 min)

- "What helps you land quietly?" (Answer guide: bending knees, landing on both feet, landing on the front of the feet; accept anything sensible that children noticed.)
- "Was hopping easier on one foot than the other?" (Answer guide: any honest answer; many people have a stronger foot.)

✓ Closing check (2 min)

Each child jumps into their hoop and freezes. (Answer guide: look for two feet taking off together and bent knees on landing. Note who did it. Hopping is not checked yet; just note who tried.)

Vocabulary

jump, hop, land, soft, quiet, knees, balance, one foot, two feet

Differentiation

- Support: jump down from a very low step or mat (no more than a few centimetres) holding a hand; or bounce on two feet on the spot.
- Stretch: hop along a short line; or jump and land in a shape (star, tuck) while still landing softly.

⚠ Safety

- Only jump over flat lines, not raised objects. Space hoops well apart so children do not land on each other.
- Hopping is tiring; keep it short and let children rest.
- Children with joint or balance conditions follow their own plan; seated or holding versions count as taking part.

Teacher notes

- Hopping on one foot develops at different times. Treat it as "having a go", not as a test. Term 2 comes back to balance and jumping.

Lesson 4: Clean hands

Goal: Children wash their hands in the right order, scrub for about 20 seconds, and name two times to wash.

Length: about 20 minutes. Run it near the sinks, in small groups if there are only a few sinks.

Materials

- Sinks, school-approved soap, paper towels or a dryer.
- Six large step cards (wet, soap, rub palms and backs, between fingers and thumbs and nails, rinse, dry), stuck up by the sinks.
- Optional: washable, skin-safe paint in a tray for the "missed spots" demo.
- A clock or timer with a second hand (for the teacher).

Steps

✎ Opening (3 min)

"Germs are tiny living things, too small to see. Most don't hurt us, but some can make us ill, and they ride around on our hands. Washing with soap and water helps get them off."

✎ Main activity part 1: missed spots (5 min, optional)

Each child who wants to puts a small blob of washable paint on their hands and "washes" with it (no water) the way they usually wash, for a few seconds. Then look: where is there no paint? (Usually the thumbs, the backs, between the fingers and the wrists.) "Those are the places we often miss." Then everyone washes the paint off properly in part 2. If you skip the paint, ask children to show how they usually wash and point to the thumbs and between the fingers.

✎ Main activity part 2: the six steps and our chant (8 min)

Point to each card and model at the sink:

1. Wet your hands.
2. Soap.
3. Rub palms together, then the backs of your hands.
4. Weave fingers together, twist each thumb, scratch your nails on your palm.
5. Rinse until the bubbles are gone.
6. Dry with a towel or the dryer.

Teach the scrubbing chant (written for this unit, CC0). Say it twice while scrubbing (steps 3 and 4):

> Rub the palms and rub the backs,
> In between the finger cracks,

Twist each thumb and scrub each nail,
Round and round, a snail's trail.

Each child then washes with an adult watching. Check once with a clock how long "twice through" takes for your class; aim for about 20 seconds.

✓ Discussion questions (2 min)

- "When should we wash our hands?" (Answer guide: before eating and after using the toilet are the two to remember. Accept others your class uses, such as after outdoor play, after messy play or after blowing your nose.)

✓ Closing check (2 min)

Hold up the six step cards in a jumbled order; children help put them in the right order. (Answer guide: wet, soap, rub palms and backs, between fingers and thumbs and nails, rinse, dry.)

Vocabulary

germs, soap, wash, rinse, dry, palms, thumbs, nails, wrists

Differentiation

- Support: an adult points to each card as the child washes (or guides their hands, only if the child agrees). Picture cards can stay up all year.
- Stretch: a child is "sink helper" and points to the cards for a friend.

⚠ Safety

- Walk near the sinks; wipe up spills.
- Skin-safe washable paint only; skip it for any child with sore skin or a skin condition. Use the school's soap; follow any child's skin plan.
- Check water temperature is comfortable.

Teacher notes

- The source used for this lesson recommends scrubbing for at least 20 seconds and lists the thumb, wrist, between the fingers and under the nails as the most commonly missed areas.
- Avoid scary messages about germs; the tone is "clean hands help keep us well", not fear.

Lesson 5: Safe mover show

Goal: Children show what they have learned in a short stations circuit, then do an end-of-unit check.

Length: about 25 minutes.

Materials

- The cleared space, edge cones and stop signal.
- Traffic-light cards (colour plus shape), hoops or floor spots, a flat tape "river" (not a loose rope).
- A set of the six handwashing step cards (smaller copies) per station group.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting. "This week we learned to keep our bubble, stop on the signal, land like frogs and wash our hands. Today is our show." Quick bubble walk and one freeze to warm up.

Stations circuit (10 min)

Four stations, about 2 minutes each, plus moving between them. Groups move on when the signal sounds.

1. **Bubble walk:** travel around a marked square without touching anyone.
2. **Traffic lights:** an adult or child holds up the cards; jog, walk, freeze.
3. **Frog jumps:** jump in and out of hoops and over the river; have a go at hopping (holding on is fine).
4. **Clean hands cards:** at a table, put the six handwashing cards in order and act out the scrubbing chant.

✓ Discussion questions (5 min)

- "Which station did you like best? Why?" (Answer guide: any honest answer.)
- "What is one thing that helps keep everyone safe when we move?" (Answer guide: keeping our bubble, looking where we go, stopping on the signal, landing softly; accept any sensible idea.)

✓ End-of-unit check (7 min)

Work with small groups while others play a calm bubble game or rest. Five parts:

1. **Bubble:** walk across the space and back without touching anyone. (Answer guide: no bumps, looks around. Wheeling or moving with a walker counts the same.)

2. **Stop:** jog on green, freeze on the signal. (Answer guide: freezes within about two seconds, without falling or bumping. Wheeling, or moving arms while seated, counts the same; for a deaf child, watch for the raised hand or red square card.)
3. **Jump:** jump forward with two feet and land. (Answer guide: both feet take off and land together, knees bend. A hop is a bonus, not marked. A child who cannot jump shows a seated or arm "jump": both arms push up together and come down softly. That counts.)
4. **Wash steps:** put the six cards in order, or show the steps with your hands. (Answer guide: wet, soap, rub palms and backs, between fingers and thumbs and nails, rinse, dry. Small swaps within step 3-4 are fine. Pointing, signing or using an AAC device counts the same as saying.)
5. **When to wash:** "Tell me two times we wash our hands." (Answer guide: before eating and after using the toilet. Other class times such as after outdoor play also count, but listen for at least one of these two. Pointing to picture cards, signing or AAC counts the same as saying.)

Use the extra small-group or one-to-one slot later in the week for children not checked yet.

Vocabulary

bubble, stop, signal, jump, land, hop, wash, before, after

Differentiation

- Support: each check can be shown in the child's own way: wheeling instead of walking, pointing to cards instead of saying, a seated or arm "jump".
- Stretch: a child explains one station to a younger visitor or a family member.

⚠ Safety

- Keep stations well apart, with the river and hoops away from walls.
- Give the stop signal both as a sound and something to see.

Teacher notes

- Record what each child can do, not a score. Term 2 builds on landing and balance, so note who found jumping or hopping hard.

Kindergarten Health and PE: Balance, Jumping, Ball Skills and Feelings Words (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 6 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check space, equipment, medical and wellbeing notes against your school's rules.

Kindergarten year plan · Term 1 unit: Moving safely, stop and go, and clean hands

Big idea

Our bodies get steadier with practice: we can balance, jump and land, and send and catch a big ball. Our feelings change too, and having words for them helps us tell other people and ask for help.

This is the second health and PE unit of the kindergarten year (term 2). It builds on term 1 (own space, the stop signal, soft landings). Term 3 goes on to simple team games, food and sleep, and road safety.

Outcomes

By the end of the unit a student can:

1. Hold a still balance for a count of five on a wide base (two feet, or two hands and two knees), and try a one-foot balance, holding on if needed.
2. Walk along a straight floor line, mostly keeping their feet on it.
3. Jump forward from two feet and land on two feet with bent knees, then freeze ("bend and freeze").
4. Roll a large ball to a partner, and send it with a two-handed underarm throw; catch or trap a large, soft ball thrown gently from close by.
5. Name at least four feelings (happy, sad, cross or angry, scared, and calm) and say one thing that can help when a feeling is big.

Prior knowledge

- Term 1: "my bubble" space, the stop signal (sound plus something to see), two-foot jumps with soft landings, first hops.
- Balance, throwing and catching vary a great deal at five. Some children catch a big ball easily; many trap it against their chest; some do not catch yet. Praise watching the ball and having ready hands, not just catches.
- Children already have and show feelings; many know "happy" and "sad". The aim is more words and the idea that you can tell someone.

Lessons

PE lessons are about 25 minutes; the feelings lesson is about 20 minutes and happens in the classroom. Leave a day or two between lessons. The term 1 stop signal is used in every PE lesson.

Lesson	Title	Main activity
1	Statues and wobbles	Still balances on wide and narrow bases
2	Walk the line, bend and freeze	Line walking; jumping and landing on two feet
3	Roll it, throw it, catch it	Rolling, two-handed underarm throws, catching a big ball
4	How do I feel?	Feelings words, how feelings can show, what helps
5	Balance and ball show	Stations circuit and end-of-unit check

Materials (whole class unless noted)

- A hall, playground or cleared space, as in term 1; cones or floor spots for the edge; the stop signal (drum or tambourine plus a raised hand or red card).
- Floor lines: flat tape, or rope taped down so it cannot roll or slide, about 3 metres long, one for every 4-5 children. Floor lines only; no raised beams in this unit.
- Hoops or floor spots (one per child).
- Large, soft balls (about the size of a football or a little bigger; foam or soft playground balls), one per pair. A few softer or bigger balls, or balloons or beanbags, for children who find a ball hard to catch.
- Lesson 4: four or five large picture cards of made-up children showing feelings (drawn, not photos of real pupils), and a "feelings corner" or calm spot if your class has one.

⚠ Safety and access

- **Space and floor:** check for hazards; no running in socks on a slippery floor. Pairs throwing stand well apart from other pairs, all throwing the same way.
- **Medical:** follow each child's plan (asthma, joint, heart, epilepsy, balance or vision conditions). Water available.
- **Balls:** soft balls only; gentle throws from close by; nobody throws at faces. A child may always choose to roll instead of throw, or trap instead of catch.
- **Movement in each child's own way:** children who use a wheelchair, walker or crutches balance, "line walk" and jump in their own way (holding a still seated position while reaching; wheeling along the line; a push-up lift or arm swing for a jump). Any child may hold a wall, rail or partner's hand for one-foot balances. Children with low vision may use a rope they can feel with their feet, a brightly coloured line, or a bell ball or a ball that is rolled rather than thrown.
- **Feelings:** children are never asked to share their own feelings or family events. The lesson uses made-up characters, and any child can say "pass". If a child tells you something worrying, follow your school's safeguarding procedure.
- **Touch:** support by touch (steadying a child) only with the child's agreement.

Assessment

- Lessons 1-3: the teacher watches for still balances, line walking, bend-and-freeze landings, ready hands and watching the ball, and notes them on a class list.
- Lesson 4: listen for feelings words during the card and story talk. No child has to talk about themselves.
- Lesson 5: a 5-part movement and talk check, about 3 minutes per child, with an answer guide. Plan an extra small-group or one-to-one slot in the week to finish per-child checks. Record "yes", "with help" or "not yet".

Sources

- Wikipedia, "Gross motor skill" (read 6 November 2026): https://en.wikipedia.org/wiki/Gross_motor_skill
- Object control skills include throwing, catching and kicking.
- At about five, balance and running improve.
- Children with visual impairments often achieve still (static) balance later, and use objects such as furniture for balance for longer.
- Wikipedia, "Balance (ability)" (read 6 November 2026): https://en.wikipedia.org/wiki/Balance_(ability)
- Balance means keeping the body's centre of mass over the base of support. Some sway is normal even when standing still.
- Balance uses the inner ear, the feel of the body and the floor, and sight.
- Wikipedia, "Emotional literacy" (read 6 November 2026): https://en.wikipedia.org/wiki/Emotional_literacy
- Claude Steiner's parts of emotional literacy begin with knowing your feelings and having a sense of empathy.
- Wikipedia, "Emotion classification" (read 6 November 2026): https://en.wikipedia.org/wiki/Emotion_classification
- Ekman's 1992 study proposed six basic emotions (anger, disgust, fear, happiness, sadness, surprise); whether there are basic emotions, and how reliably faces show them, is debated.
- No health or PE standard was read for this unit.

Known gaps

- No official standard was read. The choice and order of skills is mine, based on the kindergarten year plan.
- The feelings words are a small starting set, not a list of "the" basic emotions. Faces do not always show how someone feels, so the lesson teaches asking as well as looking. Feelings words and how feelings are shown differ between languages and cultures.
- One lesson on feelings is a start, not a wellbeing programme. Schools often have their own approach (a feelings check-in, a calm corner); use yours.
- Kicking is not included; many schools add it here or in term 3.
- Peer check: GPT-6.1 Terra did a bounded text check at fc872d5 (not an educator, safety or accessibility review); the four issues it raised were fixed in 688eddf. See PEERCHECKS.md.

CC0 1.0. Games in this unit were written for it and are also CC0.

Lesson 1: Statues and wobbles

Goal: Children hold still balances on a wide base for a count of five, and try narrower balances, including one foot (holding on is fine).

Length: about 25 minutes.

Materials

- The cleared space, edge cones and stop signal.
- One hoop or floor spot per child.
- A wall, rail or bench to hold for one-foot balances.

Steps

✎ Opening (3 min)

Standing in bubbles. "Stand very still. Are you completely still?" Let children notice tiny wobbles. "Everybody wobbles a little, even grown-ups. Today we find ways to be steadier."

Warm-up (4 min)

Traffic lights from term 1 (jog, walk, freeze on the stop signal), then march on the spot and stretch up tall and curl small.

✎ Main activity: statues (12 min)

1. Wide statues (4 min): move around; on the stop signal, freeze as a statue with feet wide apart. Count to five together. Then try feet together. "Which was easier to keep still?" (Usually feet apart.)
2. Four-point and three-point statues (4 min): hands and knees on the floor (four points), then lift one hand (three points). Count to five. "Now you have fewer points on the floor. Is it wobblier?"
3. One-foot statues (4 min): next to a wall, rail or partner, lift one foot a little and count. Let go only if they want to. Try the other foot.

✓ Discussion questions (4 min)

- When was it easiest to keep still? With feet wide, or lots of points on the floor. (Accept what they noticed; some children find another position easier.)
- What helps you balance on one foot? Holding on, arms out, looking at one spot, going slowly. (Any reasonable idea.)
- Is wobbling bad? No. Everyone wobbles a little; practice makes it smaller.

✓ Closing check (2 min)

"Show me your steadiest statue and hold it while I count to five." Then: "Show me a wobblier one." Look for a wide base for the steady one and a narrower base (fewer points or one foot) for the wobbly one.

Vocabulary

balance, still, wobble, steady, statue

Differentiation

- **Support:** stay with wide statues; count to three; hold a partner's hands.
- **Stretch:** one-foot statue with arms out, then with eyes on a spot on the wall; a "make a bridge" statue on two hands and two feet.
- **Different ways to move:** a seated statue (sit tall, then lift one hand or reach out to one side and hold); wheel and freeze.

⚠ Safety

- Keep statues low and on the floor; no balancing on equipment in this lesson.
- Children with balance or vision conditions may hold on throughout. Do not ask children to close their eyes when balancing.

Teacher notes

- "Wide base is steadier" is what most children will feel, and it matches the idea of keeping the body over what it stands on. Do not insist; if a child says a narrow position felt easier, accept it.

Lesson 2: Walk the line, bend and freeze

Goal: Children walk along a straight floor line, and jump forward from two feet, landing on two feet with bent knees and freezing ("bend and freeze").

Length: about 25 minutes.

Materials

- The cleared space, edge cones and stop signal.
- Floor lines (flat tape, or rope taped down along its whole length so it cannot roll or slide; about 3 metres long), one for every 4-5 children.
- One hoop or floor spot per child.

Steps

✎ Opening (3 min)

Show a floor line. "This is a tightrope, but it's on the floor, so it is low and safe to step off. Can you walk all the way along it?"

Warm-up (4 min)

Traffic lights (jog, walk, freeze), then wide statues from lesson 1 on the stop signal.

✎ Main activity: lines and landings (12 min)

1. Line walking (5 min): in small groups at each line, walk slowly along it, one child at a time. Arms out like wings. Try heel to toe if they want. Then sideways steps along the line.
2. Bend and freeze (7 min): standing behind a floor spot, jump forward with two feet onto or past it. Land on two feet, knees bend, freeze. "Bend and freeze!" Then jump over a floor line, side to side, three times, freezing after each.

✓ Discussion questions (4 min)

- What helped you stay on the line? Going slowly, arms out, looking ahead. (Any reasonable idea.)
- Why do we bend our knees when we land? It makes landing soft and quiet and helps us stop. (Accept "so it doesn't hurt" or "so we don't fall".)
- What does "freeze" mean after a jump? Stay still on two feet before you move again.

✓ Closing check (2 min)

Each child does one jump to a spot and freezes. "Show me bend and freeze." Look for two feet, bent knees and a still finish.

Vocabulary

line, slowly, land, bend, freeze

Differentiation

- **Support:** a wider line (two lines side by side, each taped flat like the others; walk between them); hold an adult's hand; small jumps.
- **Stretch:** walk the line forwards then backwards slowly; jump and land in a hoop; three jumps in a row with a freeze after each.
- **Different ways to move:** wheel along the line; "jump" with a push-up lift or a big arm swing; children with low vision use a rope they can feel with their feet.

⚠ Safety

- Lines are secured flat on the floor: tape, or rope taped down so it cannot roll under a foot. Loose rope can trip children.
- Children can still wobble and fall over even on a floor line. Check the floor is dry, clear and non-slip, and keep lines away from walls, furniture and sharp edges.
- Leave space between groups so children do not jump into each other.
- One child on each line at a time; others wait behind.

Teacher notes

- Many five-year-olds step off the line now and then. "Mostly on the line" is the aim.

Lesson 3: Roll it, throw it, catch it

Goal: Children roll a large ball to a partner, send it with a two-handed underarm throw, and catch or trap a large, soft ball thrown gently from close by.

Length: about 25 minutes.

Materials

- The cleared space, edge cones and stop signal.
- One large, soft ball per pair; a few softer or bigger balls, balloons or beanbags for children who want them.

Steps

✎ Opening (3 min)

Hold up a ball. "When a ball is coming, what do you think your eyes should do?" (Watch it.) "And your hands?" (Get ready.) Show "ready hands": hands out in front, fingers spread, like a big bowl.

Warm-up (4 min)

Traffic lights, then "bend and freeze" jumps from lesson 2 on the stop signal.

✎ Main activity: send and catch (12 min)

Pairs sit or stand about 2 big steps apart, all pairs facing the same way, with space between pairs. On the stop signal, everyone holds their ball still.

1. Roll (3 min): sitting with legs apart, roll the ball to your partner. They stop it with both hands. "Watch it all the way."
2. Two-handed underarm throw (4 min): standing, hold the ball low in two hands, swing it forward and let go so it goes up a little and over to your partner. Gentle. Count three good throws.
3. Catch or trap (5 min): partner makes ready hands. Throw gently. Catch with hands, or hug the ball in to your chest ("trap it"). Both count. If it is too hard, go back to rolling or use a softer ball, balloon or beanbag.

✓ Discussion questions (4 min)

- What helped you catch? Watching the ball, ready hands, a gentle throw, standing close. (Any reasonable idea.)
- If you miss, what can you do? Fetch it, try again, stand a bit closer, ask for a gentler throw.

- What makes a throw easy for your partner to catch? Gentle, to their tummy, not to their face, and when they are ready.

✓ Closing check (2 min)

Each pair shows one gentle throw and one catch or trap to the adult, who walks round and watches a few pairs. Look for watching the ball and hands ready; a trap counts. A catch from an adult throw for every child needs more time: do it later in small groups (or keep it for the lesson 5 check).

Vocabulary

roll, throw, catch, ready hands, gentle

Differentiation

- **Support:** keep rolling; a bigger, softer ball or a balloon (slower); sit closer.
- **Stretch:** take one step back after three good catches; clap once before catching; bounce the ball once to your partner.
- **Different ways to move:** throw and catch seated; roll down a ramp or along a table; a bell ball or bright ball, rolled, for children with low vision.

⚠ Safety

- Soft balls only; throws go to the tummy, never at faces. Pairs keep apart and face the same way so balls do not cross.
- On the stop signal, balls are held still.

Teacher notes

- Trapping against the chest is a normal stage before catching with hands. Praise watching and ready hands first.

Lesson 4: How do I feel?

Goal: Children name feelings (happy, sad, cross or angry, scared, calm), notice that feelings can show in faces and bodies but not always, and say one thing that can help when a feeling is big.

Length: about 20 minutes, in the classroom.

Materials

- Four or five large picture cards of made-up children, each showing one feeling: happy, sad, cross, scared, calm. Drawn pictures, not photos of real pupils.
- A short made-up story (below).
- Your class calm spot, if you have one.

Steps

✎ Opening (3 min)

"Feelings are what we feel inside. Everybody has them, grown-ups too. Today we learn some words for feelings." Show the happy card. "How do you think this child feels?" (Happy.)

✎ Main activity: feelings words (11 min)

1. Feelings cards (5 min): show each card. Children say the word and, if they want, make the face or body shape. Add the word to a class feelings display. Words: happy, sad, cross (or angry), scared, calm.
2. Story (4 min): tell it slowly and pause at each question.

> Sami was building a tall tower of blocks. (How might Sami feel? Maybe happy or proud; accept other ideas if the child can say why.) A ball rolled into it and the tower fell down. (How might Sami feel now? Maybe sad or cross; both are fine.) Then a dog barked very loudly outside. (Now? Maybe scared, or surprised.) Sami's friend helped build the tower again, and they sat together and took slow breaths. (Now? Maybe happy or calm.)

Accept any feeling a child can explain: we can only guess how someone else feels, so "might" is the right word. 3. What helps (2 min): "When a feeling is very big, what can help?" Tell a grown-up or a friend; take slow breaths; have a hug if you want one; go to the calm spot; have a drink of water. Try three slow breaths together.

✓ Discussion questions (4 min)

- Can you always tell how someone feels by looking at their face? Not always. Some people look calm when they are worried, or don't show feelings in their face. You can ask: "Are you OK?"
- Is it OK to feel cross? Yes, all feelings are OK. Hurting people or things is not OK, even when we are cross.

- Can you feel two things at once? Yes, sometimes, like excited and a bit scared on the first day somewhere new.

✓ Closing check (2 min)

Point to two cards in turn: "What's this feeling?" Then: "Tell me one thing that can help when a feeling is big." Any child may answer by pointing to a card or showing a breath.

Vocabulary

feeling, happy, sad, cross, angry, scared, calm

Differentiation

- **Support:** fewer cards (happy, sad, scared); point instead of saying the word; use the class's home-language words alongside.
- **Stretch:** add "excited", "worried" and "surprised"; "What might make Sami feel that way?"
- **Communication:** children can sign, point to a card or use a device. Autistic children and others may show or read feelings differently; never require eye contact or making faces.

⚠ Safety

- Children are not asked about their own feelings or what happens at home. The story and cards are made up. Any child can say "pass".
- If a child tells you something worrying, follow your school's safeguarding procedure.

Teacher notes

- The five words are a starting set, not "the" basic emotions; researchers disagree about whether there are basic emotions and how reliably faces show them (see Sources). The aim is having some words and knowing you can ask and tell.
- Feelings words and how feelings are shown differ between languages and cultures. Welcome words from children's home languages.

Lesson 5: Balance and ball show

Goal: Children use the unit's skills at stations, and the teacher checks each child's balance, landing, catching and feelings words.

Length: about 25 minutes, plus extra time in the week for one-to-one checks (about 3 minutes per child).

Materials

- The cleared space, edge cones and stop signal.
- Four stations: floor lines; floor spots for jumping; soft balls (one per pair); a statue spot next to a wall or rail.
- The feelings cards from lesson 4.
- A class list for recording "yes", "with help" or "not yet".

Steps

✎ Opening (3 min)

"Today we show what our bodies have learned to do. There are four stations. When you hear and see the stop signal, freeze, then move to the next one."

Warm-up (4 min)

Traffic lights, then wide statues on the stop signal.

✎ Main activity: four stations (14 min)

Small groups, about 3 minutes per station, then the stop signal and move on (about 2 minutes in total for changing over).

1. **Statues:** wide statue, then one-foot statue (holding on is fine), count to five.
2. **Line walk:** walk the floor line, then sideways steps.
3. **Bend and freeze:** jump to a spot, land on two feet, freeze.
4. **Catch:** roll, then throw and catch or trap with a partner.

The teacher or another adult stays at one station and starts the checks below.

Closing (4 min)

Back in bubbles. Three slow breaths together. "Which station was your favourite? Which was trickiest?" (Any answer.)

✓ End-of-unit check (one-to-one or in a small group)

About 3 minutes per child. Any child may show in their own way (seated, holding on, wheeling, pointing to a card, signing or using a device).

Part	Ask or watch	Looking for
1	"Show me your steadiest statue while I count to five."	A still hold on a wide base (two feet, or hands and knees).
2	"Now try standing on one foot. Holding on is fine."	Tries; lifts a foot briefly (a few seconds is good at this age).
3	"Jump to that spot and show me bend and freeze."	Two-foot take-off, two-foot landing, bent knees, still finish.
4	Adult throws a large, soft ball gently from about two steps.	Watches the ball, ready hands; catches or traps it.
5	Point to two feelings cards: "What's this feeling?" Then: "What can help when a feeling is very big?"	Names two feelings (e.g. sad, scared); one helpful idea (tell a grown-up, slow breaths, calm spot, a hug if wanted).

Record "yes", "with help" or "not yet" for each part. Part 2 is a "tried it" part: lifting a foot while holding on counts as "yes". Part 5 is about the cards, never about the child's own feelings. The "Looking for" column describes the usual way; a child who shows the skill in their own way (a seated or supported hold, wheeling to the spot, trapping the ball with arms or body, tracking it by sound, pointing or signing) is recorded "yes", with a note of how. "With help" means an adult helped with the skill itself, not that the child used an accessible way of doing it.

Vocabulary

Review: balance, steady, line, land, bend, freeze, catch, ready hands, feelings words.

Differentiation

- **Support:** stations with fewer steps (wide statue only; rolling only).
- **Stretch:** one-foot statue without holding on; catch after one step back.
- **Different ways to move:** as in lessons 1-3.

⚠ Safety

- Same space, ball and touch rules as lessons 1-3. Pairs at the catch station keep apart and face the same way.

Teacher notes

- Use the check to plan term 3, where team games need stopping, sending and catching. Children marked "not yet" for catching can keep using a bigger, softer ball.

Kindergarten Health and PE: Taking Turns, Food and Sleep, and Stop, Look, Listen (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 6 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check space, equipment, food, medical, road-safety and wellbeing notes against your school's rules.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Kindergarten year plan · Term 1 unit: Moving safely, stop and go, and clean hands · Term 2 unit: Balance, jumping, ball skills and feelings words

Big idea

Games work when everyone takes turns and plays together. Our bodies need many kinds of food, water and plenty of sleep. Near roads, we stop, look and listen, and we always cross with a grown-up.

This is the third health and PE unit of the kindergarten year (term 3). It builds on term 1 (own space, the stop signal, clean hands) and term 2 (balance, rolling and throwing, feelings words).

Outcomes

By the end of the unit a student can:

1. Wait for their turn in a small-group game and pass the turn on (for example by handing over a beanbag or tapping the next player's hand).
2. Play a simple team game where everyone works towards one shared goal, and follow its one or two rules.
3. Say that our bodies need many different foods and water, and sort pictures of fruit and vegetables by colour.
4. Put four pictures of a made-up bedtime routine in order, and say that children need lots of sleep to grow, learn and feel well.
5. Show and say the road steps: stop at the kerb, hold a grown-up's hand, look all around and listen, and walk straight across when the grown-up says it is safe, still looking and listening.

Prior knowledge

- Term 1: "my bubble" space, the stop signal (sound plus something to see), clean hands before eating.
- Term 2: rolling and two-handed throws, feelings words (helpful when a game is lost or a turn feels long).
- Waiting is hard at five. Keep groups small (four or five) so that turns come round quickly, and praise good waiting.

- Children already eat, sleep and travel near roads in very different ways. The lessons use made-up characters and pictures; children are never asked what they eat, when they go to bed or how they come to school.

Lessons

PE lessons are about 25 minutes; lessons 3 and 4 are about 20 minutes in the classroom. Lesson 5 is about 25 minutes in a playground with a chalk "road", never on a real road. The term 1 stop signal is used in every PE lesson.

Lesson	Title	Main activity
1	My turn, your turn	Turn-taking games in small groups
2	One team, one goal	Shared-goal team games (fill the hoop, keep the balloon up)
3	Food that helps us grow	Many foods and water; sorting fruit and vegetable pictures by colour
4	Bo the bear goes to bed	Sleep and rest; putting a made-up bedtime routine in order
5	Stop, look, listen	Pretend-road practice in the playground and end-of-unit check

Materials (whole class unless noted)

- A hall, playground or cleared space, as in terms 1 and 2; cones or floor spots for the edge; the stop signal (drum or tambourine plus a raised hand or red card).
- Lessons 1-2: beanbags (about 4 per group of four or five, plus 20-30 for the middle hoop in lesson 2); one hoop per group plus one big hoop or mat for the middle; one large soft ball per group; one balloon per group, plus spares (check for latex allergies; use non-latex balloons or soft beach balls instead if needed).
- Lesson 3: about 20 picture cards of fruit and vegetables in different colours (for example red apple, strawberry, tomato; orange carrot, orange; yellow banana, sweetcorn; green peas, broccoli, cucumber; purple grapes, aubergine/eggplant, plum; brown or white potato, mushroom), one sorting mat with five coloured circles (red, orange or yellow, green, purple, other), each also marked with a shape (see lesson 3), with the same shape drawn in a corner of each matching food card; a picture card of a cup of water. **No food is tasted or handled in this unit.**
- Lesson 4: a teddy bear or bear puppet ("Bo"); four large picture cards of Bo's bedtime (bath or wash, brush teeth, story, lights off in bed); one small set of the same four cards per pair.
- Lesson 5: playground chalk or floor tape for a pretend road (two kerb lines about 4 metres apart), a picture of a grown-up and child holding hands, a pretend "car" (a tricycle or ride-on pushed slowly by an adult, or an adult walking with a cardboard steering wheel), and a class list for the check. Enough adults to hold hands with children in turn (the teacher plus a helper if possible). For the end-of-unit check: a ball, two fruit cards and the cup-of-water card from lesson 3, and a set of Bo cards from lesson 4.

⚠ Safety and access

- **Space and floor:** as in terms 1-2. In lesson 2, children walk (never run) to the middle hoop, and only one child per group goes at a time.
- **Medical:** follow each child's plan. Water available.
- **Food (lesson 3):** pictures only; nothing is tasted, smelled or handled, because of allergies. Foods are never called "good" or "bad", and no child's lunch, home food, body or weight is discussed. Some children may not eat some foods for religious, cultural,

medical or family reasons; all of these are fine. Adapt the picture set to foods your children know.
- **Sleep (lesson 4):** children are not asked when they go to bed or where or with whom they sleep. Bo is made up. Children's homes, rooms and routines differ, and that is fine.
- **Road safety (lesson 5):** practice is on a chalk road in a closed playground only, never on or next to a real road. The "car" moves at walking pace and is driven or pushed by an adult; children never stand in its path. The main message for five-year-olds is: **always cross with a grown-up, holding hands.** This unit does not teach children to cross alone.
- **Countries differ:** traffic drives on the left in some countries and on the right in others, so the lesson says "look all around" rather than "look left first". Use your country's crossing rules and words (kerb/curb, pavement/sidewalk).
- **Movement in each child's own way:** children who use a wheelchair, walker or crutches take turns, play the team games and practise the road steps in their own way (wheeling to the hoop; holding the grown-up's hand or keeping a hand on the wheelchair while the grown-up pushes). Children with low vision can use a bell ball, a bright tape kerb they can feel with their feet, and extra listening practice. Deaf or hard-of-hearing children use the visual stop signal, and in lesson 5 "look all around" carries more of the work; "listen" can be signed or shown, and they hold the grown-up's hand as everyone does.
- **Touch:** holding hands for the road practice is with an adult the child knows; a child who does not want to hold a hand may hold the adult's sleeve or a short loop, or walk with a hand on the wheelchair or pushchair, as many children do on real streets.

Assessment

- Lessons 1-2: the teacher watches for waiting, passing the turn on and following the game rules, and notes them on a class list.
- Lessons 3-4: listen for "many foods", "water" and "sleep helps us grow" during the talk; the closing checks use pointing or speaking.
- Lesson 5: a 5-part road-steps and talk check, about 3 minutes per child, with an answer guide. Plan an extra small-group slot in the week to finish per-child checks. Record "yes", "with help" or "not yet".

Sources

- Wikipedia, "Green Cross Code" (read 6 November 2026): https://en.wikipedia.org/wiki/Green_Cross_Code
- The Green Cross Code is a UK pedestrian road-safety campaign begun in 1970 by what is now the Royal Society for the Prevention of Accidents (RoSPA).
- Its basic tenets, "Stop, Look, Listen, Think", have stayed the same. The 2018 version: think, find the safest place to cross; stop near the kerb; look all around and listen; wait until it is safe and let traffic pass; go straight across, not running or walking diagonally; keep looking and listening while you cross.
- The earlier Kerb Drill was replaced partly because its military style was confusing to children.
- Wikipedia, "Pedestrian safety" (read 6 November 2026): https://en.wikipedia.org/wiki/Pedestrian_safety
- Road traffic crashes kill about 300,000 pedestrians a year; the World Health Organization says crashes are predictable and preventable.

- Responsibility for pedestrian safety is contested; the idea that pedestrians are to blame was partly promoted by motoring lobby groups. (This is why the lesson is about how we keep safe together, not about blaming walkers.)
- Wikipedia, "Sleep" (read 6 November 2026): https://en.wikipedia.org/wiki/Sleep
- Children need many hours of sleep to develop and function, up to 18 hours a day for newborns, declining with age.
- A bedtime routine usually involves rituals such as a bath, brushing teeth and a bedtime story, and a consistent bedtime; it can improve a child's sleep. These look different in different families.
- Wikipedia, "Healthy diet" (read 6 November 2026): https://en.wikipedia.org/wiki/Healthy_diet
- A healthy diet gives the body what it needs, including water; it may contain fruits, vegetables and whole grains, and can be met from many plant-based and animal-based foods.
- Wikipedia, "Turn-taking" (read 6 November 2026): https://en.wikipedia.org/wiki/Turn-taking
- About conversation: speakers take turns, conventions vary by culture, and turn-taking develops very early. Used only as background; the games are mine.
- No health, PE or road-safety standard or official guidance was read for this unit.

Known gaps

- No official standard or road-safety guidance was read; the Green Cross Code is UK-specific. Use your local road-safety guidance and crossing rules.
- No sleep-hours figure for five-year-olds is given, because the source read gives none for this age. Do not invent one; use your health service's guidance if you want a number.
- One lesson each on food and sleep is a start, not a nutrition or sleep programme. Schools often have their own food policy; use it.
- The team games are cooperative on purpose. Many schools add simple competitive relays here; if you do, keep teams small and praise good waiting, not only winning.
- Peer check: Gemini 4 Argon did a bounded text, timing, link, safety and lesson 5 check at 7b62558 (not an educator, safety or accessibility review); timings sum and links resolve. Its four notes (water card in the check; flexible bedtime order; access routes as a full "yes" in the crossing check; shape symbols and low-vision cues on the food cards) were fixed in 30f8485, which Argon also diff-checked the same day (see PEERCHECKS.md). Not reviewed by a teacher.

CC0 1.0. Games, Bo the bear and the routine cards in this unit were written for it and are also CC0.

Lesson 1: My turn, your turn

Goal: Children wait for their turn in a small group, pass the turn on clearly, and say what good waiting looks like.

Length: about 25 minutes, in the hall or playground.

Materials

- Stop signal; cones or spots for the edge.
- One hoop and one large soft ball per group of four or five; 4 beanbags per group.
- A class list for notes.

Steps

✎ Opening (5 min)

Warm-up from term 1: walk, jog and freeze on the stop signal in "my bubble". Then sit in a circle. "Today's games need turns. When it is my turn, I play. When it is your turn, I wait and watch. Then I pass the turn on."

✎ Main activity: turn games (12 min)

1. Pass and say (4 min): groups of four or five sit in small circles. One child holds the ball, says their name (or signs it, or just smiles) and rolls the ball to someone in the group. That child now has the turn. "The ball tells us whose turn it is."
2. Beanbag in the hoop (5 min): each group stands behind a floor line about 2 metres from its hoop. One child at a time throws one beanbag underarm towards the hoop. When all four beanbags are thrown, one child (a different one each round) fetches them and hands them to the next throwers; anyone who has not had a turn yet goes first. Children move the line closer or further for themselves. "Did everyone get a turn?"
3. Tap to pass (3 min): groups stand in a line. The first child does any move (a jump, a hop, a stretch, a spin of the wheels) and taps the next child's hand to pass the turn. The next child copies the move and adds a new one, then taps on. Children may skip adding a move and just copy.

✓ Discussion questions (5 min)

- How did you know it was your turn? The ball or beanbag came to me; someone tapped my hand; it was my place in the line.
- What does good waiting look like? Watching the player, staying in my space, cheering, keeping hands to myself.
- What can help if waiting feels too long? Count the people before me, watch and cheer, take a slow breath (term 2 feelings words: it is OK to feel cross about waiting).

✓ Closing check (3 min)

Show one group playing "pass and say" for one round. Ask the class: "Who has the turn now?" (Whoever has the ball.) "What should everyone else do?" (Wait and watch.) Note children who waited and passed the turn on.

Vocabulary

turn, my turn, your turn, wait, pass, group

Differentiation

- **Support:** groups of three so turns come round faster; an adult sits in the group; a picture card "my turn" that moves with the ball.
- **Stretch:** in "tap to pass", remember and copy two earlier moves.
- **Movement and communication:** a child can roll, push or hand over the ball or beanbag instead of throwing; name-saying can be signed, pointed to on a name card or skipped.

⚠ Safety

- Groups well apart; beanbags thrown only towards the group's own hoop, never at people.
- Fetching happens only when the whole group has thrown.

Lesson 2: One team, one goal

Goal: Children play two games where the whole group works towards one shared goal, follow one or two simple rules, and say how they helped the team.

Length: about 25 minutes, in the hall or playground.

Materials

- Stop signal; cones or spots for the edge.
- One hoop per group of four or five, placed round the edge; one big hoop or mat in the middle with 20-30 beanbags in it.
- One balloon per group, plus spares (non-latex if anyone has a latex allergy), or soft beach balls.

Steps

✎ Opening (4 min)

Warm-up: walk and freeze; then "team statues": on the stop signal, each group makes one shape together (a tall tower, a long snake). "Today the whole team has one goal."

✎ Main activity: shared-goal games (13 min)

1. Fill the hoop (7 min): groups line up behind their own hoop at the edge. Rules: (1) one child from each group at a time; (2) walk, don't run, to the middle, take **one** beanbag, walk back and put it in the hoop, then tap the next child. On the stop signal, everyone freezes and each group counts its beanbags together. Play twice. Second time, the goal is shared by the whole class: "Can we empty the middle hoop together before the drum?" (Count the class total, not the winner.)
2. Keep it up (6 min): groups of four or five stand in a small circle with one balloon. The team goal is to keep it off the floor by tapping it gently upward, each tap by a different person if they can. Count taps together. If it touches the floor, start counting again; nobody is "out". Try to beat the team's own best count.

✓ Discussion questions (5 min)

- What was the team's goal in "keep it up"? To keep the balloon off the floor together, and beat our own best count.
- How did you help your team? Waiting my turn, tapping gently, saying "yours!", cheering, picking up and starting again.
- What did we do when the balloon fell? Started again; nobody was out, and it was nobody's fault.

✓ Closing check (3 min)

"Tell me one rule of 'fill the hoop'." (One child at a time; walk, don't run; one beanbag each time.) "Show me with your thumb: was our class goal reached?" Note children who followed the rules and who helped others.

Vocabulary

team, goal, rule, together, help, best count

Differentiation

- **Support:** one rule only ("walk, don't run"); a buddy walks with a child; bigger, slower balloons.
- **Stretch:** in "keep it up", call the next person's name before tapping.
- **Movement:** a child who uses a wheelchair or walker can wheel to the middle and carry the beanbag on their lap, or the group can bring the hoop closer; balloon taps can be with any body part or a short soft bat. Children with low vision may use a bright beach ball with a bell inside.

⚠ Safety

- Walking only in "fill the hoop"; one child per group in the middle at a time keeps the middle uncrowded.
- Balloons: non-latex if needed; gentle taps; burst balloon pieces picked up at once (a choking risk).

Lesson 3: Food that helps us grow

Goal: Children say that our bodies need many different foods and water, name some fruits and vegetables, and sort fruit and vegetable pictures by colour.

Length: about 20 minutes, in the classroom.

Materials

- About 20 picture cards of fruit and vegetables in different colours, for example:
  - red: apple, strawberry, tomato
  - orange or yellow: carrot, orange, banana, sweetcorn
  - green: peas, broccoli, cucumber
  - purple: grapes, aubergine (eggplant), plum
  - other colours: potato, mushroom
- A sorting mat with five circles, each with a colour and a shape so that children with colour-vision differences can use it too: red circle with a heart; orange-or-yellow circle with a sun; green circle with a leaf; purple circle with a star; white circle with a question mark for "other colours". Draw the matching shape in a corner of each food card too, so children can sort by shape if colours are hard to tell apart. For children with low vision, say each card's colour aloud and make the shapes raised (glue, felt or a sticker) so they can be felt.
- A picture card of a cup of water.
- **No real food.** Nothing is tasted, smelled or handled, because of allergies.

Steps

✎ Opening (3 min)

"Cars need fuel to go. Plants need water and light. What do our bodies need to grow and play?" Take ideas. "Our bodies need lots of different foods, and water to drink, and sleep (next lesson!)."

✎ Main activity: many foods (10 min)

1. Name the pictures (3 min): hold up cards one by one; children name them if they can, in any language. "Is this a fruit or a vegetable?" Accept both for tomato and say that people argue about it.
2. Colour sort (5 min): children come up in turns (practising lesson 1) and put a card on the matching circle. Count each circle together. "Our bodies like lots of different colours of fruit and vegetables, on different days."
3. Water (2 min): show the cup of water. "When we run and play, we get thirsty. Water helps our bodies." Remind the class where they can get water at school.

✓ Discussion questions (5 min)

- Is any one food all our bodies need? No; our bodies need many different foods and water.
- Are some foods good and some bad? We don't say that. Different foods help in different ways, and people eat different foods at home, and that's fine.
- Why do we wash our hands before eating? (Term 1.) To wash away germs we can't see.

✓ Closing check (2 min)

Point to the purple circle: "Name a purple food." (Grapes, aubergine, plum.) Then: "What should we drink when we are thirsty after playing?" (Water.) Any child may answer by pointing to a card.

Vocabulary

food, fruit, vegetable, water, grow, thirsty

Differentiation

- **Support:** three circles only (red, green, other); match a card to a picture already on the circle.
- **Stretch:** "Find two foods that are the same colour but different shapes."
- **Communication:** children may point, sign or use a device; home-language food names are welcome.

⚠ Safety

- Pictures only; no tasting, smelling or handling of food.
- Never discuss children's lunches, home food, bodies or weight. Some children do not eat some foods for religious, cultural, medical or family reasons; say that this is fine.
- Adapt the picture set to foods your children know.

Lesson 4: Bo the bear goes to bed

Goal: Children say that sleep and rest help us grow, learn and feel well, and put four pictures of a made-up bedtime routine in order.

Length: about 20 minutes, in the classroom.

Materials

- A teddy bear or bear puppet, "Bo".
- Four large picture cards of Bo's bedtime: (1) bath or wash, (2) brush teeth, (3) story, (4) lights off in bed. One small set of the same four cards per pair, mixed up.
- Optional: a quiet piece of music for the rest time.

Steps

✎ Opening (3 min)

Bo yawns and rubs its eyes. "Bo is sleepy! Sleep is when our bodies and brains rest. Sleep helps us grow and get ready for a new day. Children usually need more sleep than grown-ups, and babies need the most."

✎ Main activity: Bo's bedtime (10 min)

1. Bo's story (3 min): "This is what Bo does every night. First Bo has a bath. Next Bo brushes its teeth. Then Bo has a story. Last, lights off and Bo goes to sleep." Show each big card as you say it.
2. Mixed-up cards (5 min): mix the big cards. "Oh no, Bo's bedtime is all mixed up!" Pairs put their small cards in order: bath, teeth, story, lights off. Use the words first, next, then, last (this links to computing "clear instructions").
3. Rest time (2 min): children lie down or sit comfortably, close their eyes if they want, and breathe slowly like a sleeping bear while the music plays. "How does your body feel when it rests?"

✓ Discussion questions (5 min)

- Why does Bo need sleep? To rest, grow and feel well; to have energy to play and learn tomorrow.
- What might Bo feel like after not enough sleep? Maybe tired, grumpy or cross, and finding it hard to play (term 2 feelings words; "might").
- Is everyone's bedtime the same? No. Families do bedtime in different ways. Many have a story or a wash, and going to bed at about the same time helps.

✓ Closing check (2 min)

Show the big cards mixed up: "What does Bo do first?" (Bath or wash.) "What does Bo do last?" (Lights off and sleep.) "Why do we need sleep?" (To rest, grow and feel well.) Any child may answer by pointing to a card.

Vocabulary

sleep, rest, tired, bedtime, first, next, then, last

Differentiation

- **Support:** three cards (bath, story, sleep); an adult reads the cards with the pair.
- **Stretch:** add a fifth card of their own (for example pyjamas or a drink of water) and say where it goes.
- **Communication:** pointing, signing or a device are all fine.

⚠ Safety

- Children are never asked when they go to bed, where they sleep or who they sleep with. Bo is made up.
- Rest time is optional: any child may sit and watch instead of lying down.
- If a child tells you something worrying, follow your school's safeguarding procedure.

Lesson 5: Stop, look, listen

Goal: Children practise the road steps on a pretend road in the playground (stop at the kerb, hold a grown-up's hand, look all around and listen, walk straight across when the grown-up says it is safe, keep looking and listening), and finish the end-of-unit check.

Length: about 25 minutes in a closed playground, plus per-child checks (about 3 minutes each) over the week.

Materials

- Playground chalk or tape: two "kerb" lines about 4 metres apart, with the "pavement" (sidewalk) outside them and the "road" between.
- A picture of a grown-up and a child holding hands.
- A pretend "car": a tricycle or ride-on pushed slowly by an adult, or an adult walking with a cardboard steering wheel and saying "brrrm".
- The teacher plus a helper if possible, to hold hands with children in turn.
- The stop signal; a class list for the check.
- For the check: the lesson 2 balloon or ball, two lesson 3 fruit cards and the lesson 3 cup-of-water card, the lesson 4 Bo cards.

Steps

✎ Opening (4 min)

Sit on the "pavement". "Roads are for cars, buses and bikes. They are fast and heavy. Drivers can't always see small people. So near roads we have a rule: **we always cross with a grown-up, holding hands.**" Show the picture. "Today we practise on a pretend road. We never practise on a real road."

✎ Main activity: the road steps (12 min)

1. Teach the steps (3 min) with actions:
    - **Stop** at the kerb (feet together on the pavement, a step back from the line).
    - **Hold hands** with your grown-up.
    - **Look all around** (turn your head both ways and behind) and **listen** (hand to ear).
    - **Wait** if a car is coming; let it go past.
    - **Walk straight across** when the grown-up says it's safe, still looking and listening. Don't run.
2. Practise with the pretend car (7 min): children cross in twos or threes, each holding an adult's hand (or the adult's sleeve, or with a hand on the wheelchair). The adult with the "car" sometimes drives slowly along the road and sometimes waits out of the way; children who are waiting on the pavement watch and call "car coming!" or "it's clear!". The car never drives towards a child, and children never step into the road while it moves.

3. Stop game (2 min): children walk around the playground; on the stop signal they find the nearest kerb line and **stop** a step back from it.

✓ Discussion questions (4 min)

- Who do we cross the road with? A grown-up, holding hands.
- Why do we look and listen? To see and hear cars, bikes and buses; some are quiet, so we look as well as listen.
- Why walk straight across, not run? Running can make us trip; straight across is the shortest way.

✓ Closing check (5 min)

Whole class: "Show me the steps!" Children do the actions together (stop, hold hands, look all around, listen, walk). Then begin the per-child checks.

✓ End-of-unit check (about 3 minutes per child)

Do this in a quiet corner of the playground or hall, one child at a time (or two together), with the class list. Record "yes", "with help" or "not yet".

Part	Ask or show	Answer guide
1	Roll the ball to the child and say "Your turn: roll it back, then it's my turn."	Rolls the ball back (passes the turn on). Any way of passing it is fine.
2	"Tell me one rule of 'fill the hoop'."	One child at a time / walk, don't run / one beanbag.
3	Show two fruit cards and the water card: "Our bodies need lots of different foods and something to drink. What drink?"	Water (saying it or pointing to the water card). Naming a fruit is a bonus.
4	Give the four Bo cards mixed up: "Put Bo's bedtime in order."	Bath or wash, teeth and story in any sensible order (families do these differently), then lights off last. With help is fine.
5	At the pretend kerb: "Show me how we cross the road."	Stops at the kerb, takes the adult's hand (or sleeve, loop, or the adult's hand on the wheelchair), looks all around and listens (or shows or signs "listen"), waits for the grown-up to say it is safe, walks or wheels straight across. Each of these routes is a full "yes".

A child may answer by pointing, signing, showing or using a device. Any movement in the child's own way counts.

Vocabulary

road, kerb (curb), pavement (sidewalk), stop, look, listen, safe, cross

Differentiation

- **Support:** fewer steps (stop, hold hands, look); the adult says the words while the child does the actions.
- **Stretch:** "What if a ball rolls into the road?" (Stop; don't chase it; tell a grown-up.)
- **Access:** deaf or hard-of-hearing children rely more on looking, and "listen" can be shown or signed; children with low vision use a bright tape kerb they can feel and extra listening; wheelchair users stop a wheel's width back from the line.

⚠ Safety

- Pretend road in a closed playground only. Never practise on or next to a real road.
- The "car" moves at walking pace, is controlled by an adult and never drives towards a child.
- The message is always "cross with a grown-up". This lesson does not teach children to cross alone.
- Traffic drives on the left in some countries and on the right in others; use your local crossing rules and words.

Grade 1 Health and PE: Moving and Dodging: Travelling, Warming Up and Safe Tag (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 9 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check space, footwear, medical and contact notes against your school's rules. Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 1 year plan - Term 1

Big idea

Our bodies can travel in many ways, along many paths, and change direction quickly. A short warm-up that starts gently and gets faster gets us ready to move. In chasing games we keep each other safe with our space, a gentle tag and rules that give everyone a turn.

This is the first health and PE unit of the grade 1 year (term 1). It builds on the kindergarten units: "my bubble" space, the stop signal and soft landings from Moving safely, stop and go, and clean hands, and taking turns from Taking turns, food and sleep, and stop, look, listen. Term 2 (planned) goes on to throwing, kicking and catching.

Outcomes

By the end of the unit a student can:

1. Travel in at least four ways (for example walk, jog, gallop, side-step, hop, or their own way of wheeling or moving) and change between them on a signal.
2. Follow a straight, curvy or zigzag pathway shown on a card.
3. Dodge: change direction quickly to get past a cone or away from a partner without touching anyone.
4. Say what a warm-up is for ("to get my body ready") and that it starts gently and gets faster; lead one move of the class warm-up.
5. Play a tag game safely: a gentle "butterfly tag" on the shoulder, upper arm or upper back only; keeping to the space; following the game's rules.

Prior knowledge

- From kindergarten: "my bubble" space, freezing on the stop signal, two-foot jumps with soft landings, and taking turns.
- Most six-year-olds can walk, run and jump; galloping and side-stepping are usually possible, and hopping and skipping are still developing. Skipping usually keeps improving between about 7 and 12, so many children will not skip yet. Praise trying and their own way of moving.
- Many children already play chasing games at break time, often with their own rules. The unit uses that knowledge and adds safety rules.

Lessons

PE lessons are about 30 minutes (opening 3, warm-up 5, main 15, discussion 4, closing check 3). Leave a day or two between lessons. The stop signal from kindergarten is used in every lesson, and the class warm-up from lesson 2 starts lessons 3-5.

Lesson	Title	Main activity
1	Many ways to travel	Travelling words, pathway cards, high and low
2	Wake up, body!	Building a class warm-up that starts gently and gets faster
3	Dodge and swerve	Zigzag cones, side-steps and a "shadow and dodge" partner game
4	Safe tag	Butterfly tag, safe hoops and rotating taggers
5	Moving and dodging show	Stations and a one-to-one check

Materials (whole class unless noted)

- A hall, playground or cleared space with clear edges, at least a couple of metres from walls and furniture. Cones or floor spots to mark the edge.
- The stop signal from kindergarten, both heard and seen: a drum or tambourine plus a raised hand or a red card with a square.
- A class list for notes (every lesson). Water available in every lesson.
- Ear defenders and a quiet spot at the edge for children who need them (every lesson).
- Lesson 1: eight large travel cards, each with a word and a simple stick picture (walk, jog, gallop, side-step, hop, jump, tiptoe, "your own way"); three large pathway cards with a thick drawn line (straight, curvy, zigzag); a set of the three pathway cards (smaller copies) per group of four; floor tape or chalk to lay one example of each path; blank small cards and a pencil per group for early finishers.
- Lesson 2: six large warm-up cards with a word, a stick picture and dots from 1 (gentle) to 3 (faster), so the order can be read without colour: march (1), arm circles (1), knee lifts (2), side-steps (2), leg swings holding a wall or partner (2), jog gently (3); a set of the six cards (smaller copies) per group of four; the lesson 1 travel cards.
- Lesson 3: the large warm-up cards; about 20 cones or floor spots for zigzag lanes (five per lane, four lanes, about 1.5 metres apart); four lane-start floor spots.
- Lesson 4: the large warm-up cards; three to four tagger bibs (or soft sashes), each also marked with a big star shape so taggers can be seen without colour; six hoops or floor spots as safe "dens"; a large "where to tag" picture card (a body outline with the shoulders, upper arms and upper back shaded and the head, face and neck crossed out) and a second, plain body-outline card with no shading for checks; a timer with a second hand for the teacher; one or two short, soft foam noodles (about 50 cm); if touch tag is not allowed, one soft cloth "tail" (about 40 cm) per child.
- Lesson 5: the travel, pathway and warm-up cards (large and small sets); about 10 cones or floor spots and two lane-start spots for two zigzag lanes; two tagger bibs, three dens, the "where to tag" and plain outline cards, the foam noodles (and tails if used); three station signs with a picture (travel, dodge, tag); the timer.
- For blind or low-vision children: a sighted guide partner (every lesson); a raised-line copy of each pathway card (a line of dried glue on card); glue dots on the small warm-up cards; a small bell or shaker for the guide to sound before each turn in the zigzag.

⚠ Safety and access

- **Space and floor:** check the space for hazards before each lesson. Trainers or bare feet on a suitable surface, as your school allows; no socks on a slippery floor. Mark edges well away from walls.
- **Medical:** check records for conditions that affect exercise (asthma, heart, joint, epilepsy, diabetes) and follow each child's plan; keep inhalers to hand. Children can rest at the edge whenever they need to.
- **Stop signal for everyone:** always give it as a sound and as something to see, so deaf children and children who are not looking both get it.
- **Contact:** tags are a gentle tap with an open hand on the shoulder, upper arm or upper back only; never the head, face or neck; no pushing, pulling or grabbing clothes. Any child may choose not to be tagged by hand and use a foam noodle tag instead (or be tagged that way), with no reason needed.
- **Moving in your own way:** children who use a wheelchair, walker or crutches travel, dodge and tag in their own way (wheeling, turning, a foam noodle tag). Blind or low-vision children can travel with a sighted guide partner (holding hands, an elbow, or a short soft loop held by both) and can be told about the pathways by touch with a raised-line card (glue lines on card) as well as by walking them with the guide. Children who find noise or crowds hard can have ear defenders, a quiet spot at the edge and a smaller group.
- **Everyone keeps playing:** no tag game in this unit knocks children out; being tagged means a short job (freeze, or swap roles), then back in.
- **Feeling your heart:** in lesson 2 children may put a hand on their own chest to feel their heart. This is opt-in; children who do not want to can notice breathing or feeling warm instead.

Assessment

- Lessons 1-4: the teacher watches for changing travel on a signal, following a pathway, dodging without touching and gentle tags in the right place, and notes it on a class list.
- Lesson 5: a one-to-one check with five parts and an answer guide (about 4 minutes per child). Plan extra small-group or one-to-one slots in the week to finish the checks; some children show more when the whole class is not watching.

Sources

- Wikipedia, "Warming up" (read 9 November 2026): https://en.wikipedia.org/wiki/Warming_up
- A warm-up generally has a gradual increase in intensity (a "pulse raiser"), joint mobility exercise and stretching, followed by the activity; warm-ups should be specific to the activity.
- Dynamic stretching (moving a body part through its range) is recommended as part of a warm-up; static stretching held too long may weaken muscles and is not recommended as part of a warm-up.
- Evidence on warm-ups preventing injury is mixed; a 2010 meta-analysis found improved performance in about four-fifths of studies.
- Wikipedia, "Tag (game)" (read 9 November 2026): https://en.wikipedia.org/wiki/Tag_(game)

- Many variants; safe areas ("base", "den") where players cannot be tagged; freeze tag, where tagged players stay still until a free player unfreezes them.
- Some schools ban tag over injuries, rough play and complaints that it can lead to harassment; some allow only supervised tag with "butterfly tagging", a light tap on the shoulders, arms or upper back.
- A quoted president of the US National Association for Sport and Physical Education said teachers must modify rules, choose boundaries and keep pupils safe, and emphasise tag games that develop participation, fair play and cooperation.
- Wikipedia, "Gross motor skill" (read 9 November 2026): https://en.wikipedia.org/wiki/Gross_motor_skill
- By 5, balance and running have improved; between about 7 and 12 children's running speed increases and they get better at skipping.
- The grade 1 year plan (health and PE, term 1).
- No health or PE standard was read for this unit.

Known gaps

- No official standard was read. The choice and order of skills is mine, based on the grade 1 year plan.
- Sources on warm-ups and injury disagree, so the unit says a warm-up "gets your body ready" and does not promise that it stops injuries.
- The unit uses moving stretches (leg swings, arm circles) and no long held stretches, following the warm-up source; check this against your school's PE guidance.
- Tag rules differ between schools; some do not allow tag. Lesson 4 can be played as "tail tag" (taggers pull a cloth tail tucked into the waistband, no touching) if touch tag is not allowed.
- Skipping is only offered as a try; many grade 1 children will not skip yet.
- Pacing is untested; a class new to the space may need two sessions for lesson 4.
- Gemini 4 Argon text-checked the README and lessons 1-5 at 1b0b206 on 9 November 2026 (timings, links, counts, the warm-up order, safety and access routes were consistent); three notes (a plain outline card for the tag checks, tail-tag answer guides, water and ear defenders in every lesson's materials) were fixed in 8a891cb, which Argon also diff-checked the same day (see PEERCHECKS.md). This is a peer check by an AI agent, not an educator review.
- The order of lessons, the games and the timings are my choice, not taken from a source.

CC0 1.0. Games, cards and the warm-up in this unit were written for it and are also CC0.

Lesson 1: Many ways to travel

Unit overview - Next: Lesson 2

Goal: Children travel in at least four ways, change on a signal, and follow straight, curvy and zigzag pathways while keeping their own space.

Length: about 30 minutes.

Materials

- The cleared space and edge cones or floor spots.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- Eight large travel cards, each with a word and a stick picture: walk, jog, gallop, side-step, hop, jump, tiptoe, "your own way".
- Three large pathway cards with a thick drawn line: straight, curvy, zigzag.
- A set of the three pathway cards (smaller copies) per group of four.
- Floor tape or chalk to lay one example of each path.
- For blind or low-vision children: a raised-line copy of each pathway card (a line of dried glue on card), and a sighted guide partner.
- Blank small cards and a pencil per group (early finishers).
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge. "In kindergarten we learned our bubble and the stop signal. Show me your bubble with your arms. Now freeze!" (give the signal). "Today we find lots of different ways to travel."

Warm-up (5 min)

Walk in the space, then march, then jog gently, freezing on the signal three or four times. "Bubbles safe? Who is moving into the empty spaces, not following a friend?"

✎ Main activity (15 min)

1. **Travel cards (6 min).** Hold up one card at a time, say the word, and show it. Children travel that way until the stop signal. Try walk, jog, gallop (one foot always in front, like a horse), side-step (step together sideways, facing the same way), tiptoe, jump, hop (holding a partner's hand or the wall is fine), and "your own way". Children who use a wheelchair, walker or crutches show each card in their own way (fast and slow wheeling, turning, a big arm swing for "jump").
2. **High and low (3 min).** Travel tall (on tiptoe, arms up) and small (crouched walk, or leaning low in a chair). Change on the signal.

3. **Pathways (6 min).** Show the three pathway cards and walk each one on the taped or chalked example. Groups of four get a set of small cards; one child holds up a card and the others travel that path in the space, then swap the card holder. Blind or low-vision children trace the raised-line card with a finger, then walk the path with their guide.

✓ Discussion questions (4 min)

- "Which way of travelling was fastest? Which was slowest?" (Answer guide: usually jogging is fastest and tiptoe or crouching is slowest; accept what children noticed.)
- "How did you keep your bubble when everyone was zigzagging?" (Answer guide: looking up, going into empty spaces, slowing down near others; any sensible safety idea.)

✓ Closing check (3 min)

Hold up a travel card and a pathway card together (for example "gallop" + "curvy"); children travel that way until the stop signal. Do three pairs. (Answer guide: watch who changes travel and path to match both cards and stops without bumping; note it on the class list.)

Vocabulary

travel, walk, jog, gallop, side-step, hop, tiptoe, pathway, straight, curvy, zigzag, high, low

Differentiation

- Support: travel beside an adult or partner; use only two cards at a time; walk every path before trying it faster.
- Stretch: make up a new way to travel and teach it to the group; try a skip (step-hop, step-hop) as an extra card.
- Early finishers in the pathway groups: draw a new pathway on a blank small card (a spiral, a wave) for the group to try.

⚠ Safety

- Galloping and hopping can tire legs quickly; keep each turn short.
- Hopping is a try, not a test. Holding on is fine, and children may hop on either foot.
- Cards are read aloud and shown, so children who cannot read yet, and deaf children, both get them.

Teacher notes

- "Side-step" here means stepping sideways and bringing the feet together; it comes back in lesson 3 for dodging.

Lesson 2: Wake up, body!

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children learn that a warm-up gets the body ready, that it starts gently and gets faster, and they put a class warm-up in order.

Length: about 30 minutes.

Materials

- The cleared space and edge cones or floor spots.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- Six large warm-up cards with a word, a stick picture and dots: march (1 dot), arm circles (1 dot), knee lifts (2 dots), side-steps (2 dots), leg swings holding a wall or partner (2 dots), jog gently (3 dots).
- A set of the six warm-up cards (smaller copies) per group of four.
- The eight travel cards from lesson 1 (for the warm-up).
- For blind or low-vision children: raised dots (glue dots) on the small warm-up cards so the order can be felt.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting. "Who has seen a cat wake up? It stretches and moves slowly first, then it can run." Ask: "What do you think a warm-up is?" (Accept ideas.) Say: "A warm-up gets our bodies ready to move. It starts gently and gets faster."

Warm-up (5 min)

Use the lesson 1 travel cards: walk, then side-step, then gallop gently, freezing on the signal. "This was a warm-up too. Did it start gently?"

✎ Main activity (15 min)

1. **Learn the moves (5 min).** Show each large warm-up card and do it together for about 20 seconds: march on the spot; arm circles (small, then bigger, forwards then backwards); knee lifts (marching high); side- steps across the space and back; leg swings (hold the wall or a partner, swing one leg gently forwards and back, then the other); jog gently. Point out the dots: one dot is gentle, three dots is faster. Children in a wheelchair do arm circles, shoulder rolls and pushing forwards and back; any child may do the moves seated.

2. **Feel the change (3 min).** After the jog, freeze. "Put a hand on your chest if you want to. Can you feel your heart? Is it faster than when we sat down?" (Usually yes.) Children who prefer not to can notice their breathing or feeling warmer.
3. **Order the warm-up (7 min).** Groups of four get the six small cards and put them in an order that starts gently and gets faster (one-dot cards first, three-dot card last). Each group then leads its warm-up once while the class follows, about 10 seconds a move. Blind or low-vision children feel the glue dots to sort the cards.

✓ Discussion questions (4 min)

- "Why do we start gently, not with our fastest running?" (Answer guide: so our bodies get ready step by step; to warm up our muscles slowly; accept sensible ideas.)
- "When else might people warm up?" (Answer guide: before sport, before dancing, singers before singing; any reasonable example.)

✓ Closing check (3 min)

Hold up three warm-up cards out of order (for example jog gently, march, knee lifts). "Which comes first, and which comes last?" Children point or say. (Answer guide: march first (1 dot), knee lifts next (2 dots), jog gently last (3 dots). Note who orders them correctly.)

Vocabulary

warm-up, gently, faster, heart, breathing, ready, muscles

Differentiation

- Support: sort only three cards (one of each dot number); do the moves next to an adult.
- Stretch: add a move of their own and decide how many dots it gets.
- Early finishers: practise leading the class warm-up in a clear loud voice or with clear signs.

⚠ Safety

- Leg swings are always done holding a wall or a partner, and gently.
- No long held stretches in this warm-up; we keep moving.
- Feeling your heart is opt-in. Never ask a child to touch someone else's chest.
- Water available; children with asthma follow their plan and may rest.

Teacher notes

- The source we used says a warm-up builds up gradually and includes moving stretches; it also says evidence on warm-ups preventing injury is mixed. So say "gets our bodies ready", not "stops us getting hurt".
- Keep the class warm-up from this lesson; it starts lessons 3-5.

Lesson 3: Dodge and swerve

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children change direction quickly to get past a cone or away from a partner, without touching anyone.

Length: about 30 minutes.

Materials

- The cleared space and edge cones or floor spots.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six large warm-up cards from lesson 2.
- About 20 cones or floor spots for zigzag lanes (five per lane, four lanes), placed about 1.5 metres apart in a zigzag.
- Four lane-start floor spots.
- For blind or low-vision children: a sighted guide partner; a small bell or shaker for the guide to sound at each turn.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting. "Have you ever had to move quickly out of the way, like when a ball rolls towards you or someone runs past?" Show a dodge: walk forwards, plant one foot, push off it and go the other way. "That's a dodge. Today we learn to dodge and swerve."

Warm-up (5 min)

The class warm-up from lesson 2, led by one group using the large cards.

✎ Main activity (15 min)

1. **Zigzag lanes (6 min).** Groups line up at the four lane-start spots. One child at a time walks the zigzag, going round each cone, then jogs back down the side of the lane to the start. Second turn: side-step the zigzag. Third turn: jog it, "push off your outside foot to turn". Next child starts when the one in front reaches the second cone.
2. **Shadow and dodge (6 min).** Pairs, in their own part of the space. One is the "shadow", one the "dodger". The dodger moves slowly and changes direction; the shadow tries to stay close, about one big step away, with no touching. On the signal, freeze: "Shadows, could you reach your dodger with one step?" Swap roles. Then speed up a little.

3. **Fake and go (3 min).** Pairs again: the dodger leans one way, then goes the other. Shadows try not to be fooled. Swap.

✓ Discussion questions (4 min)

- "What helped you dodge quickly?" (Answer guide: bending knees, small fast steps, pushing off one foot, looking where you want to go, leaning one way and going the other; accept what children noticed.)
- "How did you keep from touching your partner?" (Answer guide: watching them, slowing down, keeping a step away; any sensible idea.)

✓ Closing check (3 min)

Each child, in their lane, does one jogged zigzag (or one moved in their own way). (Answer guide: watch who changes direction at every cone without knocking cones or touching others; note it on the class list.)

Vocabulary

dodge, swerve, change direction, zigzag, push off, fake, shadow

Differentiation

- Support: walk the zigzag only; widen the gaps between cones to about 2 metres; an adult is the shadow.
- Stretch: put the cones closer (about 1 metre); dodge in a "fake and go" without looking at the floor.
- Wheelchair users: zigzag with wider spacing (about 2 metres); in shadow and dodge, turn and change direction in their own way.
- Blind or low-vision children: walk or jog the zigzag with a guide, who sounds the bell or shaker just before each turn.
- Early finishers: help reset knocked cones.

⚠ Safety

- Lanes are spaced at least 3 metres apart, and children return down the outside of their own lane.
- Shadows never grab or touch; it is a game of staying close, not catching.
- Quick turns are hard on a slippery floor; walk them if the floor is not grippy.

Teacher notes

- Watch for children who turn by stopping completely. Show the bent knees and push off the outside foot, but praise any safe turn.
- Lesson 4 uses these dodges in a tag game.

Lesson 4: Safe tag

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children play tag safely: gentle butterfly tags in the right place, keeping to the space, using dodges, and following rules that give everyone a turn.

Length: about 30 minutes.

Materials

- The cleared space and edge cones or floor spots.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six large warm-up cards from lesson 2.
- Three to four tagger bibs (or soft sashes), each also marked with a big star shape so taggers can be seen without colour.
- Six hoops or floor spots as safe "dens".
- A large "where to tag" picture card: a body outline with the shoulders, upper arms and upper back shaded, and the head, face and neck crossed out.
- A second, plain body-outline card with no shading, for the closing check.
- A timer with a second hand for the teacher.
- One or two short, soft foam noodles (about 50 cm) for tagging from a wheelchair or for children who choose noodle tags.
- If touch tag is not allowed at your school: one soft cloth "tail" (about 40 cm) per child, tucked loosely into the waistband at the back.
- For blind or low-vision children: a sighted guide partner.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting. "Who plays chasing games at break time? What are they called?" (Accept names: tag, tig, it, chase.) "Some chasing games can end with someone getting hurt or upset. Today we learn to play a safe tag where everyone gets to play the whole time."

Warm-up (5 min)

The class warm-up from lesson 2, then one minute of the zigzag dodges from lesson 3 in the open space.

✎ Main activity (15 min)

1. **Safe tag rules (3 min).** Show the "where to tag" card. "A butterfly tag is a gentle tap with an open hand, like a butterfly landing, on the shoulder, upper arm or upper back. Never the head, face or neck. No pushing, pulling or grabbing clothes." Practise: each

child gives a partner one butterfly tag on the upper arm, and says "too hard" or "just right". Any child can say "noodle, please" and be tagged only with the foam noodle; no reason needed.

2. **Freeze tag with dens (10 min).** Three or four taggers wear the star bibs. Tagged players freeze with arms out wide. A free player unfreezes them by gently tapping their hand. The six hoops are dens: one child per den, and only while you count to five, then out. Every 60 seconds, give the stop signal and give the bibs to new taggers, so every child who wants a turn as tagger gets one. Nobody is ever out.
3. **Check the rules (2 min).** Stop. "Hands up if you got a butterfly tag that was too hard." Talk about it calmly, without blaming, and play one more round.

✓ Discussion questions (4 min)

- "Why do we change the taggers every minute?" (Answer guide: so everyone gets a turn; so taggers don't get too tired; so it is fair.)
- "What makes tag fun and safe for everyone?" (Answer guide: gentle tags, only on shoulder, upper arm or upper back; staying in the space; no one is out; dens; stopping on the signal; any sensible idea.)

✓ Closing check (3 min)

Show the plain body-outline card (no shading). "Point to where a butterfly tag goes." Then: "Tell your partner one rule of safe tag." (Answer guide: shoulder, upper arm or upper back; rules such as gentle open hand, never head, face or neck, no pushing or grabbing, nobody is out, stop on the signal. If your class plays tail tag: point to where the tail is tucked, at the back of the waist; rules such as pull only the tail, never touch the body, hand the tail back. Note who points to the right place and names a rule.)

Vocabulary

tag, tagger, butterfly tag, gentle, den, freeze, unfreeze, fair, rule

Differentiation

- Support: play in a smaller space with one tagger and an adult beside the child; walking-only tag.
- Stretch: taggers work as a team and choose who chases whom; free players try "fake and go" dodges from lesson 3.
- Wheelchair users: tag with a foam noodle; dens can be any floor spot they can reach; if needed, play a "walking pace" round where everyone walks.
- Blind or low-vision children: play with a sighted guide partner, both holding hands; the pair counts as one player and swaps who chooses where to go.
- Children who find the game too much: be the "den keeper" who counts to five aloud, or the timekeeper with the teacher, and join when ready.

⚠ Safety

- Taggers jog, never sprint, in a shared space; if bumps start, play a walking round.
- Mark the edges well away from walls and poles; nobody runs near the edges.
- Respect "noodle, please" every time.
- If touch tag is not allowed, play "tail tag": taggers pull a tail instead of tagging, then hand it back; nobody touches a body.

Teacher notes

- Some schools restrict tag because of injuries and children feeling picked on. Supervised tag with butterfly tags, dens and no one being out is one way to keep the fun and lower those risks; follow your school's rules.
- Watch who never asks to be tagger and offer them a turn quietly.

Lesson 5: Moving and dodging show

Unit overview - Previous: Lesson 4

Goal: Children show what they have learned at three stations, lead the warm-up, and take part in a short one-to-one check.

Length: about 30 minutes, plus one-to-one check slots in the week.

Materials

- The cleared space and edge cones or floor spots.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The eight travel cards and three large pathway cards from lesson 1, and a set of small pathway cards.
- The six large warm-up cards from lesson 2, and the small sets (one per group of four).
- About 10 cones or floor spots for two zigzag lanes, and two lane-start floor spots (from lesson 3).
- Two tagger bibs with stars, three hoops or floor spots as dens, the "where to tag" card, the plain body-outline card and one or two foam noodles (from lesson 4); tails if your school uses tail tag.
- Three station signs with a picture: travel, dodge, tag.
- A timer with a second hand for the teacher.
- For blind or low-vision children: the raised-line pathway cards, glue-dot warm-up cards, a sighted guide partner and a bell or shaker.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes, and the one-to-one check below.

Steps

✎ Opening (3 min)

Sitting. "This is our show lesson. You will show your travelling, your dodging and your safe tag, and one group will lead the warm-up."

Warm-up (5 min)

A group chosen in advance leads the class warm-up with the small cards, in the order the group chose. Any child can lead a move by doing it, by saying it, or by holding up the card.

✎ Main activity: stations (15 min)

Three groups rotate every 5 minutes on the stop signal.

1. **Travel station.** One child holds up a travel card and a pathway card together; the others travel that way. Swap the card holder each time.

2. **Dodge station.** Two zigzag lanes: walk, side-step, then jog the zigzag; then "shadow and dodge" in pairs.
3. **Tag station.** Freeze tag with dens in a small space, two taggers, swapping bibs every minute. An adult stays at this station.

The teacher moves between stations, noting on the class list.

✓ Discussion questions (4 min)

- "What can you do now that you couldn't do at the start?" (Answer guide: any honest answer: gallop, side-step, zigzag, dodge, gentle tags, lead the warm-up.)
- "What would you teach a younger child about safe tag?" (Answer guide: butterfly tags on the shoulder, upper arm or upper back; no pushing; nobody is out; stop on the signal.)

✓ Closing check (3 min)

Class warm-down: walk slowly in the space, then march on the spot more and more slowly, then stand still and take three slow breaths. "Is your body calmer now?" (Answer guide: children show a thumb up, middle or down, or say it. This is a feelings check, not a right or wrong answer.)

One-to-one check (about 4 minutes per child)

Do this with one child at a time, at the edge of the space during stations or in a separate slot. Children show in their own way; moving in their own way counts as success.

1. **Travel.** Show four travel cards one at a time (for example walk, gallop, side-step, "your own way"). (Answer guide: travels in each way, or their own version of it, and changes on request.)
2. **Pathway.** Show the zigzag card. "Travel this path to the cone and back." (Answer guide: clear changes of direction, not a straight line.)
3. **Dodge.** Set three cones in a zigzag. "Go round the cones and come back." (Answer guide: changes direction at each cone without knocking them over; speed does not matter.)
4. **Warm-up.** "What is a warm-up for? Does it start gently or fast?" (Answer guide: "to get my body ready" or similar; starts gently and gets faster. Children may point to the one-dot and three-dot cards instead of speaking.)
5. **Safe tag.** Show the plain body-outline card (no shading). "Point to where a butterfly tag goes, and tell me one safe tag rule." (Answer guide: shoulder, upper arm or upper back; a rule such as gentle open hand, never head, face or neck, no pushing, nobody is out. If your class plays tail tag: the back of the waist, where the tail is tucked; a rule such as pull only the tail, never touch the body, hand the tail back.)

Vocabulary

travel, pathway, dodge, warm-up, warm-down, butterfly tag, station

Differentiation

- Support: an adult travels with the child at stations; in the one-to-one check, the child may copy the adult first, then try alone.
- Stretch: lead the dodge station and set new cone spacing; invent a new tag rule that keeps everyone safe and explain it.
- Non-speaking children answer checks 4 and 5 by pointing to cards or by signing.
- Early finishers at a station: help reset cones or hold the cards.

⚠ Safety

- Same rules as lessons 1-4: stop signal seen and heard, butterfly tags only, "noodle, please" respected, nobody out, jog not sprint.
- An adult stays at the tag station.
- Water available; children may rest at the edge.

Teacher notes

- The warm-down is not in the earlier lessons; it is a calm end to the unit and can be used after any later PE lesson.
- Keep the travel, warm-up and "where to tag" cards; term 2 (planned) uses the warm-up again.

Grade 1 Health and PE: Throw, Catch, Kick and Calm Down (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 9 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check space, equipment, medical and wellbeing notes against your school's rules. Text-checked by two other agents (Gemini 4 Argon, GPT-6.1 Terra); see Known gaps.

Back to the grade 1 year plan - Term 2

Big idea

We can send and receive objects: throw a beanbag to a target, catch something coming towards us, and kick a ball along the ground to where we want it to go. These skills get better with practice, and missing is part of practising. When a feeling gets big (for example when we keep missing), there are things we can try that may help us calm down, and a grown-up we can tell.

This is the second health and PE unit of the grade 1 year (term 2). It builds on Balance, jumping, ball skills and feelings words from kindergarten (rolling, a two-handed underarm throw, catching a big ball, five feelings words) and on the grade 1 term 1 unit Moving and dodging (the class warm-up, the stop signal and lanes). Term 3 goes on to games with fair rules, teeth, medicines and asking for help.

Outcomes

By the end of the unit a student can:

1. Throw a beanbag underarm towards a target, stepping forward with the foot opposite the throwing hand (or in their own way), so that it lands in or near a hoop about 3 metres away.
2. Catch a scarf they toss up themselves, and catch (or trap against the body) a large soft ball thrown gently from about 2 metres, with "ready hands" and eyes on the ball (or an agreed alternative, such as stopping a rolled bell ball by listening).
3. Kick a still ball along the ground with the inside of the foot through a cone gate about 3 metres away (or send it in their own way), and stop a gently rolled ball.
4. Say how a character in a made-up story might feel, using a feelings word (the kindergarten words or the new words frustrated, worried, proud and excited).
5. Show or tell two ways to calm down that may help when a feeling is big (for example slow breaths, counting to five, squeeze and let go, going to the calm spot, telling a grown-up you trust).

Prior knowledge

- From kindergarten: rolling a big ball to a partner, a two-handed underarm throw, catching or trapping a big soft ball from close by, and the words happy, sad, cross or angry, scared and calm, with one thing that can help when a feeling is big (from the story of Sami's tower).
- From grade 1 term 1: the class warm-up, the stop signal (heard and seen), lanes, and moving in your own way.

- Throwing, catching and kicking vary a great deal at six. Many children still catch by trapping the ball against their chest, and many throw without stepping forward yet. These skills usually keep improving for years. Praise watching the target or ball and "ready hands", not just hits and catches.

Lessons

PE lessons are about 30 minutes (opening 3, warm-up 5, main 15, discussion 4, closing check 3). Leave a day or two between lessons. The stop signal is used in every lesson, and the class warm-up from term 1 starts every lesson.

Lesson	Title	Main activity
1	Throw to a target	Underarm beanbag throws into hoops at three distances
2	Ready hands	Scarf catches, beanbag self-catches, partner catches with a big soft ball
3	Kick and stop	Kicking a still ball through cone gates; stopping a rolled ball
4	Big feelings, calm bodies	A made-up story (Remy's beanbag game), new feelings words, five calm-down ways, "pause, breathe, try again"
5	Throw, catch and kick stations	Three stations and a one-to-one check

Materials (whole class unless noted)

- A hall, playground or cleared space with clear edges, at least a couple of metres from walls and windows. Cones or floor spots to mark the edge.
- The stop signal, both heard and seen: a drum or tambourine plus a raised hand or a red card with a square.
- The six large warm-up cards from term 1 (every lesson).
- A class list for notes (every lesson). Water available in every lesson.
- Ear defenders and a quiet spot at the edge for children who need them (every lesson).
- Lesson 1: one beanbag per child; eight hoops; 24 floor spots (three throwing lines per hoop, at about 2, 3 and 4 metres; tape or chalk marks also work); one large "how to throw" picture card (look, swing back, step with the other foot, let go and point).
- Lesson 2: one soft chiffon or juggling scarf per child; one beanbag per child; one large, soft foam ball (about 20 cm across) per pair; four or five small soft foam balls (about 10 cm) for the stretch; 30 floor spots (two per pair, about 2 metres apart); one large "ready hands" picture card (hands out in front, fingers spread, eyes on the ball).
- Lesson 3: one large soft foam ball per pair (the same balls as lesson 2, or soft size 3 footballs); 16 cones for eight gates, each about 1 metre wide; 16 floor spots (a kicking spot about 3 metres from each gate and a partner spot just behind each gate); one large "how to kick" picture card (stand beside the ball, swing, kick with the inside of the foot, watch the ball); a foam noodle (about 50 cm) for children who push the ball instead of kicking.
- Lesson 4: one large picture of Remy (a made-up child) for each of the four parts of the story; nine large feelings cards with drawn faces and the word (happy, sad, cross, scared, calm, frustrated, worried, proud, excited); five large calm-down cards with a picture and the word (slow breaths, count to five, squeeze and let go, calm spot, tell a grown-up you trust); a set of the five calm-down cards (smaller copies) per group of four; the class calm spot (or a mat or corner set up as one); one beanbag per child, eight hoops and eight floor spots at about 3 metres from the lesson 1 throwing game.
- Lesson 5: three station signs with a picture (throw, catch, kick); the lesson 1 throwing set for one station (beanbags, four hoops, 12 floor spots); the lesson 2 scarves, foam balls and

floor spots for one station; the lesson 3 cones and balls for four gates; the "how to throw", "ready hands" and "how to kick" cards; the Remy pictures, feelings cards and calm-down cards for the one-to-one check; the foam noodle; a separate check corner with one hoop, two cones as a gate, three floor spots (3 metres from the hoop, 3 metres from the gate, 2 metres from the teacher), three beanbags, one scarf and one foam ball.

- For blind or low-vision children (every lesson): a sighted guide partner; a ball with a bell inside (or a foam ball in a crisp plastic bag, which rustles); for throwing, a sound source left in the hoop with nobody near it (a battery-powered beeper or small radio), placed and fetched only while throwing is stopped; for kicking, a small bell or clapper for the partner behind the gate (the soft ball rolls along the ground); raised-line copies of the "how to" picture cards (glue lines on card) and of the calm-down cards.

⚠ Safety and access

- **Space and floor:** check the space before each lesson. Trainers or bare feet on a suitable surface, as your school allows. Keep throwing and kicking well away from windows, doors and walls with pictures.
- **Soft equipment only:** beanbags, scarves and large soft foam balls (or soft size 3 footballs for kicking). No hard balls, and no balloons (latex allergy and bursting).
- **One direction:** in every throwing and kicking game everyone sends in the same direction, from lines or spots. Nobody walks into the target area to collect until the stop signal and "collect" are given. Kicking lanes are at least 3 metres apart.
- **Faces:** throws are aimed at hoops, gates or a partner's "ready hands" at chest height, never at anyone's face or head. Partners throw gently and only when the catcher says or shows "ready".
- **Medical:** check records for conditions that affect exercise (asthma, heart, joint, epilepsy, diabetes) and follow each child's plan; keep inhalers to hand. Children can rest at the edge whenever they need to.
- **Stop signal for everyone:** always give it as a sound and as something to see.
- **Moving in your own way:** children who use a wheelchair or walker throw and catch seated or standing as suits them; instead of kicking they can push the ball along the floor with a hand, a foot rest or a foam noodle. Blind or low-vision children use the bell ball, a guide, and a sound at the target; catches can be rolled along the floor. Children without full use of their hands can trap a ball against their body, or send it by pushing or kicking; their own way counts. Children who find noise hard can wear ear defenders and work in a smaller group.
- **Feelings and calm-down ways:** feelings are only talked about through Remy, a made-up child. Never ask children about their own feelings at home or what happens in their family. Sharing in class is opt-in: children may point to a card, show an idea, or pass. Slow breathing is gentle and optional; children with asthma or who feel dizzy breathe normally and use another way. If a child tells you something worrying, follow your school's safeguarding procedure.

Assessment

- Lessons 1-4: the teacher watches for looking at the target, stepping with the opposite foot, ready hands, kicking with the inside of the foot, and notes it on a class list. Agreed alternatives (a rolled bell ball, a sound guide, a seated throw) count fully. Using a calm-

down card in the lesson 4 game is optional and is not noted or treated as evidence of feelings.
- Lesson 5: a one-to-one check with five parts and an answer guide (about 4 minutes per child), done in the check corner while the others rotate through stations. Plan extra small-group or one-to-one slots in the week to finish the checks.

Sources

- Wikipedia, "Gross motor skill" (read 9 November 2026): https://en.wikipedia.org/wiki/Gross_motor_skill
- Gross motor skills include object control skills such as throwing, catching and kicking.
- Between about 7 and 12, children usually keep getting better at throwing and kicking (for example in precision).
- Wikipedia, "Emotional self-regulation" (read 9 November 2026): https://en.wikipedia.org/wiki/Emotional_self-regulation
- Describes a "process model" of ways people manage emotions, including choosing or changing a situation (for example moving away), shifting attention (including distraction), thinking about the situation differently, and changing the response (for example calming the body).
- Distraction is described as reducing how strong an emotion feels; hiding or holding in a feeling ("suppression") has mixed findings and social costs. The unit therefore teaches calming and telling someone, never "don't show it".
- Wikipedia, "Diaphragmatic breathing" (read 9 November 2026): https://en.wikipedia.org/wiki/Diaphragmatic_breathing
- Slow breathing in through the nose and out through pursed lips; the page says it "may help" with relaxation. The unit says slow breaths "may help" and keeps them gentle and optional.
- The grade 1 year plan (health and PE, term 2).
- No health or PE standard was read for this unit.

Known gaps

- Text-checked by GPT-6.1 Terra on 9 November 2026 at 684f072 (text only): one beanbag thrown twice, the sound guide standing behind the hoop, check criteria that ignored agreed access alternatives, and the lesson 4 calm-down step being recorded. Fixed in dee6c07, which Terra diff-checked the same day; two follow-up items (a sound source in the target area, collecting before the retry) fixed in e638821, which Terra also diff-checked the same day; one wording carryover in the lesson 5 check ("turns towards the guide's sound") was then fixed in 7ec113f, which Terra also diff-checked the same day (see PEERCHECKS.md).
- Written 9 November 2026. Text-checked by Gemini 4 Argon the same day (timings, equipment counts and distances, access routes, safeguarding and opt-in rules, the one-to-one check against the outcomes): no errors reported, so no changes were needed. This is a peer check by an AI agent, not an educator review. Not yet checked by a teacher.
- No official standard was read. The choice and order of skills is mine, based on the grade 1 year plan.
- The calm-down ways are common classroom ideas. The sources describe kinds of emotion regulation in general, not tested programmes for six-year-olds, so the unit says they "may help" and does not promise they work for every child.
- Many schools already have their own feelings approach (a calm corner, a feelings check-in, a named programme); use yours where it differs.

- The year plan mentions catching a smaller ball. The unit keeps the large soft ball for most children (many six-year-olds still trap it) and offers a small soft ball as a stretch in lesson 2.
- Distances (2, 3 and 4 metres) and gate widths are my estimates; change them so most children succeed about half the time.
- The order of lessons, the games and the timings are my choice, not taken from a source.

CC0 1.0. Games, cards and the Remy story in this unit were written for it and are also CC0.

Lesson 1: Throw to a target

Unit overview - Next: Lesson 2

Goal: Children throw a beanbag underarm towards a hoop, looking at the target and stepping forward with the foot opposite the throwing hand.

Length: about 30 minutes.

Materials

- The cleared space and edge cones or floor spots.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six large warm-up cards from term 1.
- One beanbag per child.
- Eight hoops laid flat in a row along one end of the space, about 2 metres apart.
- 24 floor spots (or tape or chalk marks): three in front of each hoop, at about 2, 3 and 4 metres.
- One large "how to throw" picture card: 1 look at the target, 2 swing your arm back, 3 step with the other foot, 4 let go and point at the target.
- For blind or low-vision children: a sighted guide partner; a sound source that can be left in the hoop with nobody near it (for example a battery-powered beeper or a small radio playing quietly), placed and fetched by an adult only while throwing is stopped; a raised-line copy of the "how to throw" card.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting. Hold up a beanbag. "In kindergarten you threw a big ball with two hands. Today we throw with one hand, underarm, and try to land it in a hoop." Show the "how to throw" card and model it slowly twice: look, swing back, step with the other foot, let go and point. "If I throw with my right hand, I step with my left foot."

Warm-up (5 min)

The class warm-up from term 1, led by one group using the large cards. Add ten gentle arm swings forwards and back, like a pendulum.

✎ Main activity (15 min)

Groups of about four stand behind the 2 metre spot in front of each hoop. Everyone throws towards the hoops, in the same direction.

1. **Close throws (5 min).** One child at a time throws from the 2 metre spot, then goes to the back of the line. When each child has thrown their beanbag once, give the stop signal: "Collect." Children fetch beanbags together, then return behind the line. Remind: "Look, swing, step, point."
2. **Choose your distance (6 min).** Children may now throw from the 2, 3 or 4 metre spot. "Pick the spot where you land in the hoop about half the time." Stop and collect after every round.
3. **Freeze and point (4 min).** One more round: after letting go, children freeze with their throwing arm pointing at the hoop. The teacher walks the line: "Which foot is in front?"

✓ Discussion questions (4 min)

- "What helped the beanbag go into the hoop?" (Answer guide: looking at the hoop, swinging back, stepping with the other foot, pointing at the hoop after letting go, a gentle throw for close hoops and a bigger swing for far ones; accept what children noticed.)
- "What did you do when you missed?" (Answer guide: tried again, threw softer or harder, moved closer; any sensible idea. Missing is part of practising.)

✓ Closing check (3 min)

Each child throws once from the 3 metre spot. (Answer guide: watch who looks at the target, swings underarm and steps with the opposite foot; note it on the class list. Landing in the hoop is a bonus, not the check.)

Vocabulary

underarm, throw, target, swing, step, aim, distance

Differentiation

- Support: throw from the 2 metre spot or closer; use a bigger target (two hoops side by side, or a mat); stand side-on with the stepping foot already forward.
- Stretch: the 4 metre spot; a smaller target (a floor spot inside the hoop); throw with the other hand.
- Wheelchair users: throw seated, swinging the arm beside the chair; choose a distance as everyone else does.
- Blind or low-vision children: while throwing is stopped, an adult puts the sound source in the hoop and walks back behind the line; the child aims at the sound. The adult fetches it only on the next stop signal. If no sound source is available, the sighted guide stands beside the thrower (never in the target area), describes where the hoop is ("three big steps

ahead, a little to your left") and gently shows the direction by touching the child's arm, if the child agrees. Explore the raised-line "how to throw" card before starting.
- Early finishers: help collect beanbags on the signal.

⚠ Safety

- Everyone throws towards the hoops from behind their spot; nobody walks in front of a line until the stop signal and "Collect." Nobody stands in the target area while anyone is throwing; a sound source is placed and fetched only while throwing is stopped.
- Hoops are well away from windows, doors and pictures.
- Beanbags only; no balls in this lesson.

Teacher notes

- Many six-year-olds step with the same foot as the throwing hand, or do not step. Show it, praise any step, and do not insist on perfection.
- Left-handed children step with their right foot; check the card is shown both ways if needed.

Lesson 2: Ready hands

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children catch a scarf they toss up themselves, then catch (or trap against the body) a large soft ball thrown gently by a partner, with "ready hands" and eyes on the ball.

Length: about 30 minutes.

Materials

- The cleared space and edge cones or floor spots.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six large warm-up cards from term 1.
- One soft chiffon or juggling scarf per child.
- One beanbag per child.
- One large, soft foam ball (about 20 cm across) per pair.
- Four or five small soft foam balls (about 10 cm across) for the stretch.
- 30 floor spots: two per pair, about 2 metres apart.
- One large "ready hands" picture card: hands out in front, fingers spread, eyes on the ball.
- For blind or low-vision children: a sighted guide partner; a ball with a bell inside (or a foam ball in a crisp plastic bag, which rustles).
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting. Show the "ready hands" card. "Before you catch, get ready hands: hands out in front, fingers spread, and eyes on the thing you are catching. Show me ready hands." Drop a scarf from high up: "A scarf floats slowly, so it is the easiest thing to catch."

Warm-up (5 min)

The class warm-up from term 1, led by one group. Finish with "ready hands" on the signal: children freeze and show ready hands.

✎ Main activity (15 min)

1. **Scarf catches (4 min).** Each child in their own space tosses their scarf up and catches it. Then: catch with the other hand; clap once before catching; catch it on your elbow, knee or head.
2. **Beanbag self-catches (4 min).** Swap scarves for beanbags. Toss the beanbag a little above the head and catch with two hands; then from one hand to the other. "A beanbag falls faster than a scarf. Watch it all the way."

3. **Partner catches (7 min).** Pairs stand on two floor spots about 2 metres apart, with one foam ball. The thrower waits until the catcher shows ready hands, then sends a gentle two-handed underarm throw to the catcher's chest. Catching with the hands, or trapping it against the chest, both count. After five throws, swap. If it is going well, take one step back each.

✓ Discussion questions (4 min)

- "What made catching easier?" (Answer guide: ready hands, watching the ball all the way, a gentle throw, standing closer, a bigger or slower object; accept what children noticed.)
- "How did you help your partner catch?" (Answer guide: waited for ready hands, threw gently to the chest, said "ready?"; any kind idea.)

✓ Closing check (3 min)

In pairs on the 2 metre spots, each child receives three gentle throws. (Answer guide: watch who shows ready hands before the throw (in their own way) and watches or listens for the ball; note catches and traps on the class list. Children using an agreed alternative, such as a rolled bell ball, a beanbag or a closer spot, are checked on that alternative.)

Vocabulary

catch, ready hands, trap, toss, watch, gentle, underarm

Differentiation

- Support: stand closer (about 1 metre); use a scarf or beanbag for partner catches; bounce the ball once before it reaches the catcher; an adult is the thrower.
- Stretch: catch with hands only (no trapping); one step back after every three catches; catch a beanbag thrown by a partner; catch a small soft foam ball (about 10 cm) from 2 metres.
- Wheelchair users: catch seated; the partner throws gently to chest height in front of the chair.
- Blind or low-vision children: the partner rolls the bell ball along the floor, saying "Rolling!", and the child stops it with hands or feet; with a guide, try a bounce catch with the bell ball.
- Children without full use of their hands: trap the ball against the body or stop a rolled ball with a foot; this counts as a catch.
- Early finishers: count catches in a row with a partner and try to beat it.

⚠ Safety

- Throws go gently to the chest, never to the face, and only when the catcher shows ready hands.
- Soft scarves, beanbags and foam balls only; no balloons.
- Pairs are spread out so that loose balls do not roll into other pairs; on the stop signal, everyone holds their ball still.

Teacher notes

- Many six-year-olds still trap the ball against their chest or close their eyes as it arrives. Praise watching and ready hands; catching usually keeps improving for years.
- Lesson 4 comes back to what we can do when we keep missing.

Lesson 3: Kick and stop

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children kick a still ball along the ground with the inside of the foot through a cone gate, and stop a gently rolled ball.

Length: about 30 minutes.

Materials

- The cleared space and edge cones or floor spots.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six large warm-up cards from term 1.
- One large soft foam ball per pair (the lesson 2 balls, or soft size 3 footballs).
- 16 cones for eight gates, each gate about 1 metre wide, set up as eight lanes at least 3 metres apart.
- 16 floor spots: in each lane, a kicking spot about 3 metres in front of the gate and a partner spot about 1 metre behind it.
- One large "how to kick" picture card: 1 stand beside the ball, 2 swing your leg, 3 kick with the inside of your foot, 4 watch the ball.
- For blind or low-vision children: a sighted guide partner; a ball with a bell inside (or a foam ball in a crisp plastic bag); a small bell or clapper for the partner to sound behind the gate; a raised-line copy of the "how to kick" card.
- For children who do not kick: a foam noodle (about 50 cm) to push the ball.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting. Show the "how to kick" card. Model it: stand beside the ball, not behind it, swing the leg, and push the ball with the inside of the foot so it rolls along the ground. "We are not kicking high or hard today. We are kicking to a place, along the floor."

Warm-up (5 min)

The class warm-up from term 1, led by one group. Add gentle leg swings, holding a wall or partner.

✎ Main activity (15 min)

Groups of four (two pairs) at each lane. Everyone kicks in the same direction.

1. **Stop it (4 min).** One child on the partner spot behind the gate rolls the ball gently through the gate towards the child on the kicking spot, who stops it with the sole or inside of the foot ("put your foot on it"). Four rolls each, then swap.
2. **Kick through the gate (7 min).** The child on the kicking spot places the ball still, then kicks it with the inside of the foot through the gate. The partner stops it and rolls it back. Five kicks, then swap; then the other pair. Children who get it through most times take one step back.
3. **Kick and stop (4 min).** Pairs kick to each other through the gate: one kicks, the other stops the ball and kicks it back. Nobody runs into the next lane; a ball that leaves the lane waits for the stop signal.

✓ Discussion questions (4 min)

- "What helped the ball go through the gate?" (Answer guide: standing beside the ball, using the inside of the foot, a gentle kick, looking at the gate, a still ball; accept what children noticed.)
- "What helped you stop the ball?" (Answer guide: watching it, getting in line with it, putting a foot on top or the side; any sensible idea.)

✓ Closing check (3 min)

Each child does one kick through their gate from the kicking spot and one stop of a rolled ball. (Answer guide: watch who stands beside the ball, uses the inside of the foot, keeps the ball on the ground and stops a rolled ball in their own way; note it on the class list.)

Vocabulary

kick, inside of the foot, gate, aim, stop, roll, along the ground

Differentiation

- Support: stand closer (about 2 metres); widen the gate to about 2 metres; stop the ball with hands at first.
- Stretch: narrow the gate; kick from 4 metres; try the other foot; kick a ball that is moving slowly.
- Wheelchair users and children who do not kick: push the ball along the floor through the gate with a hand, a foot rest or the foam noodle; stop it the same way.
- Blind or low-vision children: the partner sounds the bell or clapper from behind the gate; use the bell ball; a guide helps place the ball and feel the gate cones before the first kick.
- Early finishers: count how many kicks in a row go through the gate.

⚠ Safety

- Lanes are at least 3 metres apart and everyone kicks in the same direction. If the space is too small for eight lanes, use fewer lanes and bigger groups.
- Kicks stay along the ground; no kicking at people.
- Nobody goes after a ball in another lane until the stop signal.

Teacher notes

- Many six-year-olds kick with their toes and the ball goes up or sideways. Show the inside of the foot and praise any kick that rolls.
- Kicking is beside the ball, so bare feet or soft shoes are fine with foam balls; follow your school's footwear rules.

Lesson 4: Big feelings, calm bodies

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children say how Remy, a made-up child, might feel in a story, learn four new feelings words, and try five calm-down ways that may help when a feeling is big.

Length: about 30 minutes, in the hall or cleared space.

Materials

- The cleared space and edge cones or floor spots.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six large warm-up cards from term 1.
- Four large pictures of Remy, one for each part of the story below (drawn, not photos of real children).
- Nine large feelings cards with a drawn face and the word: happy, sad, cross, scared, calm, frustrated, worried, proud, excited.
- Five large calm-down cards with a picture and the word: slow breaths, count to five, squeeze and let go, calm spot, tell a grown-up you trust.
- A set of the five calm-down cards (smaller copies) per group of four.
- The class calm spot (or a mat or corner set up as one for the lesson).
- One beanbag per child, eight hoops and eight floor spots at about 3 metres in front of the hoops (the lesson 1 set-up).
- For blind or low-vision children: a sighted guide partner; the lesson 1 sound source, placed and fetched only while throwing is stopped; raised-line copies of the calm-down cards (a glue shape on each: a circle for slow breaths, five dots for count to five, a fist outline for squeeze and let go, a square for the calm spot, a heart for tell a grown-up).
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting. Show the five kindergarten feelings cards (happy, sad, cross, scared, calm). "Who remembers these feelings words?" Children say the word or point. "Today we meet four more, in a story about Remy. Remy is made up."

Warm-up (5 min)

The class warm-up from term 1, led by one group, a little more gently than usual. Finish standing still, then sitting down.

✎ Main activity (15 min)

1. **Remy's beanbag game (6 min).** Read the story, showing each Remy picture. After each part, ask the question and let children point to a feelings card or say a word. Accept any feeling that fits and add "might": "Remy might feel ..."

   Part 1. Remy's class is playing the hoop game. Remy has been looking forward to it all day, but everyone will be watching. (How might Remy feel? Maybe excited; maybe a bit worried. Show the new cards: "excited" means really looking forward to something; "worried" means thinking something might go wrong.)

   Part 2. Remy throws and misses. Remy throws again and misses. A third time, a miss. (Now? Maybe frustrated, cross or sad. Show "frustrated": "when you try and try and it doesn't work yet.")

   Part 3. Remy's face feels hot and Remy wants to throw the beanbag hard at the wall. Instead, Remy puts the beanbag down, takes three slow breaths and counts to five. Then Remy tells the teacher, "I keep missing." The teacher says, "Try one step closer." (How might Remy feel now? Maybe calmer; maybe still a bit frustrated. Both can be true.)

   Part 4. Remy throws from one step closer, and the beanbag lands in the hoop. (Now? Maybe proud or happy. Show "proud": "feeling good about something you did or kept trying at.")

1. **Five calm-down ways (5 min).** Show each large calm-down card and try it together, briefly:
2. **Slow breaths:** "Smell the flower" (breathe in slowly through the nose), "blow out the candle" (breathe out slowly through the mouth). Three times, gently. Anyone can breathe normally instead.
3. **Count to five:** count slowly to five in your head or in a whisper.
4. **Squeeze and let go:** squeeze both hands into fists, hold for three, let go and wiggle the fingers (or squeeze and relax the shoulders).
5. **Calm spot:** point to the class calm spot. "You can go there for a little while, then come back."
6. **Tell a grown-up you trust:** "Remy told the teacher. Who are grown-ups at school you could tell?" (Answer guide: the teacher, a teaching assistant, the office staff, a lunchtime helper; any trusted adult at school.)

"Different ways help different people, and sometimes one may help and another may not. You can try another one."

1. **Pause, breathe, try again (4 min).** Groups of about four at the eight hoops, with a small set of calm-down cards laid out at each throwing spot. Children throw from the 3 metre spot, one at a time, and collect only on the stop signal and "Collect", as in lesson 1. After a miss, the thrower may touch or point to a calm-down card and do it quickly, or just carry on; it is a choice, not a rule. At the next stop signal and "Collect", everyone fetches their beanbag; children who missed then have one more try first, before the next round. "Missing is part of practising." Do not note who uses a calm-down card here: using one (or not) is not evidence of how a child feels.

✓ Discussion questions (4 min)

- "How did Remy's feelings change in the story?" (Answer guide: maybe excited and worried, then frustrated, then calmer, then proud; feelings can change, and two can happen at once.)
- "Which calm-down way might you try in the hoop game, if you want to?" (Answer guide: any of the five cards, or a child's own safe idea such as a drink of water. Opt-in: children may point, show or pass. Do not ask about feelings at home.)

✓ Closing check (3 min)

Hold up the Part 2 picture of Remy: "How might Remy feel here?" Then: "Show me one calm-down way." Children answer together by pointing to a feelings card, saying a word or showing a calm-down way. (Answer guide: any fitting feeling such as frustrated, cross or sad; any of the five calm-down ways. Note who uses a new word and who shows a calm-down way.)

Vocabulary

feeling, frustrated, worried, proud, excited, calm down, slow breaths, calm spot, trusted grown-up

Differentiation

- Support: use only the five kindergarten feelings plus "frustrated"; point to cards instead of speaking; an adult sits beside the child during the story.
- Stretch: "What else could Remy have done instead of throwing the beanbag at the wall?"; "Can you think of a time in a story or film when a character felt proud?"
- Non-speaking children: point to a feelings card or calm-down card, or use signs or their communication device.
- Blind or low-vision children: hear the story read aloud with the pictures described; explore the raised-line calm-down cards; in the throwing game they aim at the lesson 1 sound source (or the guide beside them describes the hoop's position), as in lesson 1.
- Children without full use of their hands: "squeeze and let go" can be done with the shoulders, toes or face.
- Early finishers: help lay out calm-down cards at each throwing spot.

⚠ Safety

- Feelings are only talked about through Remy. Never ask children about their own feelings at home or their family. Sharing is opt-in; passing is fine.
- Slow breathing is gentle and short. Children with asthma, or anyone who feels dizzy, breathe normally and use another way.
- The calm spot is a choice, never a punishment.
- If a child tells you something worrying, follow your school's safeguarding procedure.
- Throwing follows the lesson 1 rules: one direction, collect only on the signal.

Teacher notes

- The story shows Remy calming down and telling someone, not hiding the feeling. Avoid "Don't be cross" or "Stop crying"; say what Remy did instead.
- If your school has its own calm-down ideas or a feelings programme, use its words and pictures instead.
- Lesson 5's one-to-one check uses the Remy pictures and the calm-down cards.

Lesson 5: Throw, catch and kick stations

Unit overview - Previous: Lesson 4

Goal: Children practise throwing, catching and kicking at three stations and show what they can do in a short one-to-one check.

Length: about 30 minutes, plus extra slots in the week to finish the one-to-one checks.

Materials

- The cleared space and edge cones or floor spots.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six large warm-up cards from term 1.
- Three station signs with a picture: throw, catch, kick.
- **Throw station:** beanbags (about one per child in the group), four hoops and 12 floor spots (2, 3 and 4 metres in front of each hoop); the "how to throw" card.
- **Catch station:** one scarf per child in the group, one large soft foam ball per pair, two floor spots per pair about 2 metres apart; the "ready hands" card.
- **Kick station:** eight cones for four gates (each about 1 metre wide, in lanes at least 3 metres apart), one foam ball per pair, a kicking spot and a partner spot for each gate; the "how to kick" card; a foam noodle for children who push instead of kicking.
- **Check corner,** away from the stations: one hoop with a floor spot 3 metres in front; two cones as a gate about 1 metre wide with a floor spot 3 metres in front; a floor spot 2 metres from the teacher; three beanbags; one scarf; one foam ball; the four Remy pictures; the nine feelings cards; the five large calm-down cards; the class list.
- For blind or low-vision children: a sighted guide partner; the bell ball (or a foam ball in a crisp plastic bag); the lesson 1 sound source for the hoop and a small bell or clapper for the gate partner; the raised-line "how to" cards and calm-down cards.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.

Steps

✎ Opening (3 min)

Sitting. Show the three station signs and the "how to" cards. "Today you visit all three stations. While you practise, I'll call children one at a time to the check corner to show me what they can do."

Warm-up (5 min)

The class warm-up from term 1, led by one group.

✎ Main activity (15 min)

Three groups rotate through the stations, about 5 minutes each, moving on the stop signal. A second adult supervises the stations while the teacher runs one-to-one checks in the check

corner. If there is no second adult, the teacher supervises the stations and does the checks in the extra slots.

1. **Throw station:** choose your distance and throw underarm to the hoops; collect only on the stop signal, as in lesson 1.
2. **Catch station:** scarf catches, then partner catches with a foam ball from 2 metres, as in lesson 2.
3. **Kick station:** kick through the gate and stop the ball, in pairs, as in lesson 3.

If a child misses a lot, remind them of the calm-down cards from lesson 4: "Pause, breathe, try again."

✓ Discussion questions (4 min)

- "Which station did you find easiest? Which was hardest?" (Answer guide: any answer; skills grow at different speeds.)
- "What did you do when it didn't work?" (Answer guide: tried again, moved closer, used ready hands, took a slow breath, asked for help; any sensible idea.)

✓ Closing check (3 min)

Sitting together. "Show me ready hands. Show me how you step when you throw. Show me the part of your foot you kick with." (Answer guide: hands out with fingers spread; a step forward with the opposite foot or their own way; pointing to the inside of the foot or their own way of pushing the ball. Note it on the class list.)

One-to-one check (about 4 minutes per child)

Use the check corner. Children may use their own way of moving, throwing or pushing (seated, a foam noodle, the bell ball, trapping against the body), and may answer parts 4 and 5 by pointing to cards.

Part	Ask	Answer guide
1	"Throw these three beanbags underarm into the hoop." (From the spot 3 metres away.)	Looks at the hoop (or aims using the sound source or an agreed directional cue); swings underarm; steps with the opposite foot (or their own way). At least one lands in or near the hoop.
2	"Toss the scarf up and catch it." Then: "Show me ready hands," and throw the foam ball gently three times from 2 metres.	Catches the scarf (or a beanbag); shows ready hands in their own way; catches or traps the ball against the body at least once. Agreed alternatives count fully: a blind child stops a rolled bell ball; a child who cannot toss a scarf has it dropped for them.
3	"Kick the ball through the gate." (Three kicks from the spot 3 metres away.) Then roll the ball gently: "Stop it."	Stands beside the ball and kicks with the inside of the foot, along the ground (or pushes it in their own way); at least one goes through the gate; stops the rolled ball with a foot, hand or noodle.
4	Show the Part 2 picture of Remy (three misses). "How might Remy feel here?"	Any feelings word that fits, e.g. frustrated, cross, sad or worried (said, signed or pointed to on a card).

Part	Ask	Answer guide
5	"Show me or tell me two ways to calm down when a feeling is big."	Two of: slow breaths, count to five, squeeze and let go, the calm spot, telling a grown-up you trust; or another safe idea (a drink of water).

Record each part as "yes", "with help" or "not yet" on the class list. Ball skills usually keep improving for years, so "not yet" in parts 1-3 is common and expected at six.

Vocabulary

station, underarm, ready hands, inside of the foot, gate, calm down

Differentiation

- Support: closer spots and bigger targets at every station; an adult partner at the catch station.
- Stretch: the 4 metre throwing spot; catch with hands only; narrow the gate.
- Wheelchair users: throw and catch seated; push the ball through the gate with a hand, foot rest or the foam noodle.
- Blind or low-vision children: a guide at every station; the bell ball; at the throw station, the lesson 1 sound source in the hoop (placed and fetched only while throwing is stopped, or the guide describes the hoop from beside the thrower); at the kick station, the partner behind the gate sounds the bell or clapper, as in lesson 3.
- Early finishers: help reset cones and collect beanbags on the signal.

⚠ Safety

- Stations face away from each other, and everyone at a station throws or kicks in the same direction.
- The check corner is away from the stations so no balls or beanbags fly into it.
- Soft equipment only; collect only on the stop signal.

Teacher notes

- Plan extra slots in the week; one lesson is not enough for every child's check.
- Some children show more when the whole class is not watching; the check corner helps.

Grade 1 Health and PE: Fair Games, Healthy Teeth, Medicine Safety and Asking for Help (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 10 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check space, equipment, medical, medicine and safeguarding notes against your school's rules.
>
> Text-checked by two other agents (GLM-5.3 Flash, Gemini 4 Argon); see Known gaps.

Back to the grade 1 year plan - Term 3

Big idea

A game is fun when its rules are fair: everyone has a real chance and everyone can play. A good sport says "Good game" whether they win or lose. We can look after our bodies in small, everyday ways: brushing our teeth twice a day, keeping sugary drinks and snacks small, and only taking medicine from a trusted grown-up. When something is wrong, we can ask a trusted grown-up for help, and ask another one if the first cannot help.

This is the third health and PE unit of the grade 1 year (term 3). It builds on Taking turns, food and sleep, and stop, look, listen from kindergarten (taking turns, food words), the grade 1 term 1 unit Moving and dodging (the class warm-up, the stop signal and lanes) and the grade 1 term 2 unit Throw, catch, kick and calm down (beanbags and hoops, Remy the made-up child, and "tell a grown-up you trust").

Outcomes

By the end of the unit a student can:

1. Play a relay game by its rules (one runner at a time, stay in your lane, one beanbag each) and say whether a rule or set-up is fair or not fair, and why (for example "Their hoop is closer, so it's not fair").
2. With a group, choose and test one rule change, checking "Can everyone in our group play with this rule?", and show a good-sport way to finish a game (saying "Good game" or "Well played", a wave, a thumbs-up or a sign), whether their team won or not.
3. Say that we brush our teeth twice a day for about two minutes, show the outer, inner and chewing surfaces on a model tooth, and say that sugary drinks and snacks are best kept small.
4. Say that medicine is only given by a trusted grown-up, and say or show what to do if they find pills or a bottle they are not sure of: don't touch, don't taste, tell a grown-up.
5. Name (or point to) a trusted grown-up at school and show how to ask for help: get the grown-up's attention, say or show what is wrong, and ask another grown-up if the first one cannot help.

Prior knowledge

- From kindergarten: taking turns in a game, food words, washing hands.
- From grade 1 term 1: the class warm-up, the stop signal (heard and seen), lanes, and moving in your own way.
- From grade 1 term 2: underarm throws at hoops, Remy (a made-up child), feelings words and calm-down ways, including "tell a grown-up you trust".
- Six-year-olds usually care a great deal about winning and about whether things are fair. Many are starting to lose baby teeth. Never ask children about their own teeth, brushing, dentist visits or medicines at home; all personal examples come through Remy.

Lessons

Lessons 1 and 2 are PE lessons in the hall (opening 3, warm-up 5, main 15, discussion 4, closing check 3). Lessons 3-5 are classroom lessons (opening 5, main 15, discussion 5, closing check 5). All are about 30 minutes. Leave a day or two between lessons. The lesson 5 one-to-one check is done in extra short slots over the following days.

Lesson	Title	Main activity
1	Fair rules	A beanbag relay in lanes, then a "spot the unfair rule" round and fixing it
2	Our own fair rule	Groups test rule changes, choose one everyone can play with, and practise "Good game"
3	Looking after our teeth	A giant model tooth, the three surfaces, two-minute pretend brushing, and sorting food and drink picture cards
4	Medicine only from a trusted grown-up	Remy's story, "don't touch, don't taste, tell a grown-up", and sorting picture cards
5	Asking for help	Trusted grown-ups at school, what to say, Remy scenario cards, and a one-to-one check

Materials (whole class unless noted)

- Lessons 1-2: a hall or cleared space at least 10 metres long, with clear edges, away from walls and windows; cones or floor spots to mark the edge.
- Lessons 1-2: the stop signal, both heard and seen (a drum or tambourine plus a raised hand or a red card with a square); the six large warm-up cards from term 1; water; ear defenders and a quiet spot at the edge for children who need them.
- Every lesson: a class list for notes.
- Lesson 1: six lanes marked with cones or floor tape, about 3 metres apart (fewer lanes and longer teams if the space is narrower); 12 hoops (one at the start and one at the far end of each lane, about 8 metres apart); one beanbag per child (each team's beanbags start together in the far hoop of its lane, so a team of four has four beanbags there); two large picture cards, "fair" (a smiling face with a level balance) and "not fair" (a frowning face with a tipped balance); one small "fair" and one small "not fair" card per child (or children use thumbs up and thumbs down).
- Lesson 2: the lesson 1 lanes, hoops, beanbags and fair and not fair cards; six extra cones (one halfway along each lane); five large rule-change picture cards (hop or move in your own way; carry the beanbag on a flat hand; walk heel to toe; carry the beanbag on a paper plate; walk sideways); one paper plate per team; one blank card per team for a group's own

idea; one large "good sport" card showing four ways to say "Good game" (the words, a wave, a thumbs-up, the class sign for "good game").

- Lesson 3: one large picture of Remy; a giant model tooth (a large drawn tooth on card, or a box covered in white paper) with the outer, inner and chewing surfaces each shown in a different pattern and labelled; one large card cut-out toothbrush for the model; a two-minute sand timer; a "twice a day" picture card (a morning sun and a night moon); eight food and drink picture cards (water, carrot sticks, cucumber, cheese; sweets, fizzy drink, iced cake, a lollipop); two sorting labels ("not much sugar" and "lots of sugar: keep it small"); one small tooth picture per child, with the three surfaces outlined, and crayons.
- Lesson 4: four large pictures of Remy for the story; a "medicine rule" card with three pictures (a hand with a cross for "don't touch", a mouth with a cross for "don't taste", a child talking to a grown-up for "tell a grown-up"); eight scenario picture cards (listed in lesson 4); two sorting labels ("OK" and "Stop and tell a grown-up"). Pictures only: no real medicines, pill bottles, inhalers or sweets in the classroom.
- Lesson 5: a large picture of Remy; pictures or names of trusted grown-ups at school (the class teacher, teaching assistants, lunchtime staff, office staff, the school nurse if there is one), as your school allows; a large "how to ask for help" card with three pictures (get their attention, say what is wrong, ask another grown-up); five Remy scenario cards (listed in lesson 5); one "I need help" card per child (a picture of a raised hand and the words), which children can hand or show to an adult; a class puppet (optional); for the one-to-one check, the lesson 1 fair and not fair pictures, the "good sport" card, the small tooth picture, scenario card 2 from lesson 4 (tablets on a table) and the pictures of trusted grown-ups, plus two lane pictures (every hoop the same distance away; one hoop much closer) and a clean small tooth picture.
- For blind or low-vision children: a sighted guide partner; in lessons 1-2 a sound source at the far hoop of their lane (a battery-powered beeper or small radio), placed and fetched only while the relay is stopped; raised-line copies of the fair and not fair cards, the rule-change cards, the medicine rule card, the "how to ask for help" card and the "I need help" card (glue lines on card); a textured tooth (a different texture, such as sandpaper, corrugated card and smooth card, on each surface); scenario and food cards described aloud.

⚠ Safety and access

- **Relay space:** check the space before lessons 1 and 2. Lanes at least 3 metres apart. Runners walk or jog, stay in their own lane, go round their far hoop on the outside and come back the same way. Waiting children sit or stand behind the start hoop. Only one runner per team is out at a time.
- **No touch needed:** the next runner is sent with a wave or a high-five, whichever that child chooses.
- **Stop signal for everyone:** always given as a sound and as something to see.
- **Moving in your own way:** children who use a wheelchair, walker or crutches travel the lane in their own way; lanes are wide enough for a wheelchair. Blind or low-vision children run with a sighted guide (holding an elbow or a short loop of rope), with the sound source at their far hoop. Lesson 2's check question, "Can everyone in our group play with this rule?", must be answered for every child in the group; if not, the group changes the rule.
- **Medical:** check records for conditions that affect exercise and follow each child's plan; keep inhalers to hand. Children can rest at the edge.

- **No real toothbrushes, toothpaste, medicines, bottles or sweets:** lessons 3 and 4 use pictures, a card model and pretend brushing in the air only. No food or drink is tasted (allergies, and so nobody's food is judged).
- **Privacy:** never ask children about their own teeth, brushing at home, dentist visits, lost teeth, medicines at home or illnesses. Never inspect or comment on anyone's teeth or lunch. Personal examples come only through Remy, a made-up child. Sharing is opt-in; passing is fine.
- **No stranger-danger scripts:** lesson 5 is about asking trusted grown-ups at school for help, not about frightening stories.
- **Safeguarding:** if a child tells you something worrying (about medicine, being hurt, or anything else), follow your school's safeguarding procedure.
- **Inhalers and other prescribed medicine:** some children have an inhaler or other medicine at school as part of a plan agreed by their family and the school. That is a grown-up-agreed medicine; do not single out any child.

Assessment

- Lessons 1-4: the teacher notes on a class list who can say why a set-up is fair or not fair, who checks that everyone can play, who uses a good-sport way to finish, who shows the three tooth surfaces and says "twice a day" (and "about two minutes"), who sorts the sugar cards, and who can say the medicine rule. Pointing, signing or using a communication device counts fully.
- Lesson 5: a closing check with the "I need help" card, then a one-to-one check with five parts and an answer guide (about 4 minutes per child) in extra short slots over the following days, for example while the class does quiet reading or choice time.
- Winning or losing a game is never recorded.

Sources

- American Dental Association, MouthHealthy, "Brushing Your Teeth" (read 10 November 2026): https://www.mouthhealthy.org/all-topics-a-z/brushing-your-teeth
- "Brush your teeth twice a day with a soft-bristled brush"; brush "the outer surfaces, the inner surfaces, and the chewing surfaces"; use a fluoride toothpaste; "Eat a balanced diet that limits sugary beverages and snacks."
- National Institute of Dental and Craniofacial Research (NIDCR), "Tooth decay" (read 10 November 2026): https://www.nidcr.nih.gov/health-info/tooth-decay
- "Tooth decay begins when bacteria in your mouth make acids that attack the tooth's surface (enamel)"; when these bacteria come into contact with sugars and starches from foods and drinks, they form an acid. Its tips to prevent decay include "Brush teeth twice a day with a fluoride toothpaste" and choices "that limit sugary drinks and foods high in sugars and starches."
- KidsHealth (Nemours), "Mouth & Teeth" (read 10 November 2026; the page served at this address is the version for parents): https://kidshealth.org/en/kids/teeth.html
- The first set of 20 teeth (baby or primary teeth) "begin to fall out when a child is around 6 years old" and are replaced by permanent teeth; "Brush your teeth twice a day for two minutes at a time"; "Limit juice, sugary snacks, and sticky foods like dried fruit"; "Never walk or run with anything in the mouth, such as a toothbrush or pencil."
- Up and Away (read 10 November 2026): https://upandaway.org/en/
- An initiative of PROTECT, first created with the US Centers for Disease Control and Prevention. "To a young child, pills can look like candy and liquid medicines can look like

sugary drinks." It advises teaching children "what medicine is and why you or another caregiver must be the one to give it to them", and says "Never tell children medicine is candy." It reports that about 35,000 young children a year in the US go to the emergency room after getting into medicines left within reach.
- Wikipedia, "Sportsmanship" (read 10 November 2026): https://en.wikipedia.org/wiki/Sportsmanship
- Describes sportsmanship as enjoying a game "for its own sake, with proper consideration for fairness, ethics, respect, and a sense of fellowship with competitors"; a "good sport" is both a "good winner" and a "good loser"; the most common bad sportsmanship is cheating or breaking rules to get an unfair advantage.
- The grade 1 year plan (health and PE, term 3).
- No health or PE standard was read for this unit.

Known gaps

- Written 10 November 2026. Text-checked by two other agents on 10 November 2026 (not an educator or classroom review): GLM-5.3 Flash found no errors and made two optional wording notes (taken at a49f555); Gemini 4 Argon found no errors at a17096b, diff-checked a49f555, and made three optional access and assessment notes (taken at c88ba3a), which Gemini 4 Argon also diff-checked the same day. See PEERCHECKS.md. Not checked by a teacher.
- No official standard was read. The choice and order of topics is mine, based on the grade 1 year plan.
- The sources are US health organisations and Wikipedia. Toothpaste advice (for example how much a young child uses) and medicine rules at school differ between countries and schools; the unit leaves the amount of toothpaste to a grown-up and follows the school's medicine policy.
- The food and drink cards are an example, not from a source. Sorting them into "not much sugar" and "lots of sugar: keep it small" is a simple version of "limit sugary drinks and snacks"; it is not a full nutrition lesson, and fruit and juice are left out on purpose because they are harder to sort (KidsHealth also suggests limiting juice).
- Up and Away is about medicines. Other things children should not touch or taste (cleaning products, batteries, plants) are not covered here.
- The relay distances, lane widths and team sizes are my estimates; change them to fit your space.
- The games, story, scenarios and timings are my choice, not taken from a source.

CC0 1.0. Games, cards, the Remy story and scenarios in this unit were written for it and are also CC0.

Lesson 1: Fair rules

Unit overview - Next: Lesson 2

Goal: Children play a beanbag relay by its rules, spot a set-up that is not fair, say why, and help fix it.

Length: about 30 minutes, in the hall or cleared space.

Materials

- The cleared space (at least 10 metres long) and edge cones or floor spots.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six large warm-up cards from term 1.
- Six lanes marked with cones or floor tape, about 3 metres apart (fewer lanes and longer teams if the space is narrower).
- 12 hoops: one at each end of each lane, about 8 metres apart.
- One beanbag per child. Each team's beanbags start together in the far hoop of its lane (a team of four has four beanbags there).
- Two large picture cards: "fair" (a smiling face with a level balance) and "not fair" (a frowning face with a tipped balance).
- One small "fair" card and one small "not fair" card per child (or children use thumbs up and thumbs down).
- For blind or low-vision children: a sighted guide partner; a sound source for the far hoop of their lane (a battery-powered beeper or small radio), placed and moved by an adult only while the relay is stopped; raised-line copies of the fair and not fair cards (a level line and a tipped line).
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting. "In kindergarten we learned to take turns. Today we play a relay game, and we think about rules. A rule tells everyone how to play. A fair rule gives everyone a real chance." Show the "fair" and "not fair" cards.

Warm-up (5 min)

The class warm-up from term 1, led by one group using the large cards. Add walking, then jogging, along a lane and back.

✎ Main activity (15 min)

Teams of four or five, one team per lane, sitting behind the empty hoop at their end. The full hoop is at the far end.

The rules (show and say them, and model once with a helper):

1. One runner at a time from each team.
2. Walk or jog in your own lane to the far hoop, take **one** beanbag, come back in your lane and put it in your team's hoop.
3. Send the next runner with a wave or a high-five (the next runner chooses).
4. When all the beanbags are in your hoop, your team sits down.

Then:

1. **Practice and race (5 min).** One practice round at walking pace, then one race. After the race, give the stop signal. Each team walks along the side of its own lane to the other end, so the full hoop is now the far hoop. Say "Good game" to the class as a whole: no team is praised or teased for winning or losing.
2. **Spot the unfair rule (6 min).** "This time I am going to change one thing. Watch carefully. Your job is to spot it and say if it's fair." While everyone is sitting, move the far hoop of one lane to about 4 metres from its team (half the distance). Race once. Then stop and ask: "Was that race fair?" Children show the fair or not fair card (or thumbs). "Why?" (Answer guide: that team's hoop was closer, so they had less far to go; the others had no real chance to win.) Say clearly: "It wasn't that team's fault. They played by the rules. The set-up was not fair."
3. **Fix it (4 min).** "How can we make it fair again?" (Answer guide: move the hoop back so every team goes the same distance; or move every hoop closer.) A child shows where the hoop should go; an adult moves it while the relay is stopped. Teams turn round as before and race once more.

✓ Discussion questions (4 min)

- "What made the second race not fair?" (Answer guide: one team had a shorter distance; the rule or set-up was different for one team.)
- "What other things could make a game not fair?" (Answer guide: someone taking two beanbags, starting before the wave, cutting across a lane, one team having more runners; any sensible idea. If a child names another child, steer back to the rule: "What would the rule be?")
- "How could you tell the other team 'well done' at the end?" (Answer guide: saying "Good game", a wave, a thumbs-up. Lesson 2 practises this.)

✓ Closing check (3 min)

Describe three quick set-ups, pointing at the lanes as you go: (1) every hoop the same distance away; (2) one team allowed to take two beanbags at a time; (3) every team takes turns, one runner at a time. Children hold up "fair" or "not fair" for each. Ask two or three

children "Why?". (Answer guide: fair, not fair, fair. Note who can say why, for example "they get two, the others get one".)

Vocabulary

rule, fair, not fair, take turns, lane, relay, team

Differentiation

- Support: a partner runs alongside; shorter lanes for a team that needs them, with every team in that game using the same shorter lane.
- Stretch: "Is it fair if one team has five runners and another has four?" (Answer guide: not quite; the team of four could have one runner go twice, or one team could have fewer beanbags.)
- Wheelchair, walker or crutch users: travel the lane in their own way. If one team's travel is much slower, discuss in lesson 2 whether a rule change makes it fairer; never single out a child.
- Blind or low-vision children: run with a sighted guide holding an elbow or a short loop of rope; the sound source is at their far hoop. Explore the raised-line fair and not fair cards before the closing check.
- Deaf children: the stop signal is always seen as well as heard; the wave start works for everyone.
- Non-speaking children: answer "why" by pointing at the hoop or the lanes, or with signs or a communication device.

⚠ Safety

- Walk or jog only; no diving for beanbags.
- Everyone stays in their own lane, goes round their far hoop on the outside and comes back the same way. Only one runner per team is out at a time.
- Hoops and the sound source are moved only while the relay is stopped.
- Waiting children sit or stand behind their start hoop, not in the lane.

Teacher notes

- The unfair round is announced as a puzzle, so no team feels tricked, and the closer team is never blamed.
- Six-year-olds often say "not fair" about losing. Use the lesson to separate the two: losing a fair game is still fair.

Lesson 2: Our own fair rule

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Groups test rule changes for the relay, choose one that everyone in the group can play with, and practise finishing a game as a good sport.

Length: about 30 minutes, in the hall or cleared space.

Materials

- The cleared space and edge cones or floor spots.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six large warm-up cards from term 1.
- The lesson 1 lanes, 12 hoops and one beanbag per child.
- Six extra cones, one halfway along each lane (about 4 metres from the start), for testing rules.
- Five large rule-change picture cards: hop or move in your own way; carry the beanbag on a flat hand; walk heel to toe; carry the beanbag on a paper plate; walk sideways.
- One paper plate per team.
- One blank card per team, for a group's own idea (an adult draws or writes it).
- One large "good sport" card showing four ways to say "Good game": the words, a wave, a thumbs-up and the class sign.
- The lesson 1 "fair" and "not fair" cards.
- For blind or low-vision children: a sighted guide partner; the lesson 1 sound source, placed and moved only while the relay is stopped; raised-line copies of the rule-change cards (a simple glue shape on each: one foot, a flat hand, two feet in a line, a circle, a sideways arrow).
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting. "Last time we spotted a rule that wasn't fair and fixed it. Today your team makes up its own rule for the relay. A good rule is fair, and everyone in your team can play with it." Show the five rule-change cards.

Warm-up (5 min)

The class warm-up from term 1, led by one group. Add a few steps each of hopping (or moving in your own way), walking heel to toe and walking sideways.

✎ Main activity (15 min)

Same teams as lesson 1, one per lane.

1. **Test two rules (6 min).** Give each team two rule-change cards (or its own idea on a blank card). Each child tries each rule once, to the halfway cone and back, carrying a beanbag where the rule needs one (a flat hand or the team's paper plate). One child at a time per lane.
2. **Choose and check (3 min).** Each team chooses one rule. Before they keep it, an adult asks the check question, and the team answers it for every child: **"Can everyone in our group play with this rule?"** If the answer is no for anyone (for example hopping for a child who uses a wheelchair, or heel to toe for a child using crutches), the team changes the rule or adds "or move in your own way". The adult writes or draws the final rule on the team's card.
3. **Play and say "Good game" (6 min).** Pair each team with the team in the next lane. Show the "good sport" card: "At the end of every race, both teams say or show 'Good game' to the other team, whoever finished first. If you finish first, you can also say 'Well played'." The two teams race with team A's rule (both teams using the same rule), then with team B's rule, turning round between races as in lesson 1.

✓ Discussion questions (4 min)

- "Was it fair for both teams in a race to use the same rule? Why?" (Answer guide: yes; both teams had the same job, so both had a real chance. If each team used a different rule, one might have an easier job.)
- "Why did we ask 'Can everyone play with this rule?'" (Answer guide: so nobody is left out; a game is only fair if everyone can join in.)
- "What does a good sport do when their team wins? When their team doesn't win?" (Answer guide: winning: says "Good game" or "Well played", no showing off; not winning: says "Good game", tries again next time. Both are good sports.)

✓ Closing check (3 min)

Each team holds up its rule card and one child says or shows the rule and whether everyone could play. Then each child shows the teacher their "good game" way (words, wave, thumbs-up or sign). (Answer guide: note who answers the check question for their team and who shows a good-sport way. Any of the four ways counts.)

Vocabulary

rule, change, fair, everyone can play, good sport, "Good game", "Well played", win, lose

Differentiation

- Support: choose from two cards only; an adult helps the team ask the check question; walk the race instead of jogging.

- Stretch: invent a new rule and draw it on the blank card; "Is your rule fair if one team has a paper plate and the other doesn't?"
- Wheelchair, walker or crutch users: every rule includes "or move in your own way" if needed; carrying the beanbag on a flat hand or plate works seated.
- Blind or low-vision children: test rules with the guide; explore the raised-line rule cards; the sound source stays at the far hoop for races.
- Non-speaking children: show "Good game" with a wave, thumbs-up, sign or communication device; choose a rule by pointing to a card.
- Children without full use of their hands: carry the beanbag in the crook of an arm, or skip carrying and touch the far hoop instead; their own way counts.

⚠ Safety

- The lesson 1 rules stay: walk or jog, own lane, one runner per team, round the far hoop on the outside, hoops and the sound source moved only while the relay is stopped.
- Hopping is a few hops at a time; children can switch to walking at any point.
- Heel-to-toe and sideways walking are slow on purpose; no racing in those rules during testing.
- Paper plates only (no hard plates).

Teacher notes

- Some children will be upset about not winning. Name the good-sport ways rather than telling children not to be upset, and remind them of the term 2 calm-down ways.
- Winning and losing are never recorded.

Lesson 3: Looking after our teeth

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children learn that we brush our teeth twice a day for about two minutes, practise brushing the outer, inner and chewing surfaces on a model (and in the air), and sort food and drink pictures by how sugary they are.

Length: about 30 minutes, in the classroom.

Materials

- One large picture of Remy (the made-up child from term 2).
- A giant model tooth: a large drawn tooth on card, or a box covered in white paper, with the outer, inner and chewing surfaces each shown in a different pattern (stripes, dots, zigzags) and labelled.
- One large card cut-out toothbrush for the model.
- A two-minute sand timer.
- A "twice a day" picture card: a morning sun and a night moon.
- Eight food and drink picture cards (drawn, an example, not from a source): water, carrot sticks, cucumber, cheese; sweets, fizzy drink, iced cake, a lollipop.
- Two sorting labels: "not much sugar" and "lots of sugar: keep it small".
- One small tooth picture per child, with the three surfaces outlined, and crayons.
- For blind or low-vision children: a raised-line version of the giant tooth or small tooth picture with a different texture on each surface (sandpaper, corrugated card, smooth card); the food cards described aloud.
- A class list for notes.

Steps

✎ Opening (5 min)

Show Remy. "This is Remy again. Remy has a wobbly tooth. Remy's first teeth are called baby teeth. Many children start to lose baby teeth at around six, and a new, bigger tooth grows in its place. The new teeth are called permanent teeth, which means they are meant to stay, so we look after them." Do not ask who has lost a tooth or who has a wobbly tooth; if children offer it, say "Thank you" and move on.

✎ Main activity (15 min)

1. **Three surfaces (4 min).** Show the giant tooth. "Every tooth has an outside, an inside and a top where we chew." Point to each surface and its pattern: the **outer surface** (the side next to your cheeks and lips), the **inner surface** (the side next to your tongue) and the **chewing surface** (the top). Brush each one on the model with the card toothbrush, saying its name. Children say the names with you.
2. **Twice a day, two minutes (5 min).** Show the "twice a day" card: "Dentists say to brush twice a day: once in the morning and once at night." Show the sand timer: "Each time, about two minutes. That is longer than it feels!" Everyone holds a pretend

toothbrush in the air in front of them (not in their mouths) and "brushes" with small circles while the teacher calls out each surface and points to it on the giant tooth at the same time (so deaf and hard-of-hearing children have a visual cue): outer, inner, chewing, top teeth and bottom teeth, until the sand runs out. "A soft toothbrush and a toothpaste with fluoride in it help. A grown-up decides how much toothpaste."

3. **Sugar sort (6 min).** Explain simply: "Tiny living things called bacteria live in everyone's mouth. When they meet sugar, they make acid, and acid can hurt the hard outside of our teeth. So it's kinder to our teeth to keep sugary drinks and snacks small, and to brush." Show the eight cards one at a time. Children say or show which label each goes under; a child places it. (Answer guide: not much sugar: water, carrot sticks, cucumber, cheese; lots of sugar, keep it small: sweets, fizzy drink, iced cake, lollipop.) Say: "Sugary food isn't bad, and nobody is in trouble for eating it. We just keep it small and brush our teeth."

✓ Discussion questions (5 min)

- "Why do we brush all three surfaces?" (Answer guide: so every part of the tooth gets clean; the sugar and bacteria can be on any side.)
- "Remy's family has cake at a party. What could help Remy's teeth afterwards?" (Answer guide: a drink of water, brushing at bedtime as usual; not "never eat cake".)
- "When do we brush?" (Answer guide: twice a day, morning and night, for about two minutes.)

Do not ask who brushes at home, who has been to a dentist, or what children eat or drink at home.

✓ Closing check (5 min)

Each child marks the three surfaces on their small tooth picture in three different ways (colours, or stripes, dots and zigzags) and shows the teacher, who asks: "Show me the chewing surface. How many times a day do we brush?" (Answer guide: points to the top of the tooth; "twice" or "two" or shows two fingers or the sun and moon card. Note on the class list.)

Vocabulary

tooth, teeth, baby teeth, outer surface, inner surface, chewing surface, brush, twice a day, two minutes, sugar, sugary

Differentiation

- Support: learn "outside, inside, top" before the longer names; point to the surfaces instead of naming them.
- Stretch: "Why might sticky sweets be harder on teeth than water?" (Answer guide: accept "the sugar stays on the teeth longer" as a sensible guess; label it a guess.)
- Non-speaking children: point to the surfaces and the sun and moon card, or use signs or a communication device.

- Blind or low-vision children: explore the textured tooth (a different texture for each surface); hear each food card described.
- Children without full use of their hands: "brush" in the air with any movement they choose, or tell an adult where to brush on the model.

⚠ Safety

- No real toothbrushes or toothpaste in class. Pretend brushing is in the air, not in mouths.
- No food or drink is tasted or brought in (allergies). Cards only.
- Never comment on anyone's teeth or lunch. Never ask about brushing at home, dentist visits, lost teeth or what children eat at home.
- If a child mentions tooth pain or something worrying, tell the school nurse or follow your school's procedure; if it is a safeguarding concern, follow your school's safeguarding procedure.

Teacher notes

- The sources advise brushing twice a day, for two minutes, with a soft brush and a fluoride toothpaste, brushing all three surfaces, and limiting sugary drinks and snacks (see the unit's sources). How much toothpaste a young child uses differs between countries; the unit leaves it to a grown-up.
- KidsHealth also advises never walking or running with anything in the mouth, such as a toothbrush; you could add this as a safety tip.
- Some families cannot easily get toothbrushes or toothpaste. Never make a child feel judged; if your school has a toothbrushing scheme, follow it.

Lesson 4: Medicine only from a trusted grown-up

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children learn what medicine is, that only a trusted grown-up gives it, and what to do if they find pills or a bottle they are not sure of: don't touch, don't taste, tell a grown-up.

Length: about 30 minutes, in the classroom.

Materials

- Four large pictures of Remy, one for each part of the story below (drawn, not photos).
- A "medicine rule" card with three pictures: a hand with a cross ("don't touch"), a mouth with a cross ("don't taste") and a child talking to a grown-up ("tell a grown-up").
- Eight scenario picture cards (drawn), listed in the main activity.
- Two sorting labels: "OK" and "Stop and tell a grown-up".
- For blind or low-vision children: a raised-line copy of the medicine rule card (a glue hand, a glue mouth and two glue figures); the scenario cards described aloud.
- A class list for notes.
- Pictures only: no real medicines, pill bottles, inhalers, vitamins or sweets in the classroom.

Steps

✎ Opening (5 min)

Sitting. "When people are poorly, a doctor or nurse might say they need medicine. Medicine can help our bodies get better. Medicine can be a tablet, a liquid on a spoon, a cream, or an inhaler that helps with breathing." "Medicine is not sweets. It can help when the right person gives the right amount, but it can be dangerous if a child takes it without a grown-up." Do not ask children about medicines or illnesses at home.

✎ Main activity (15 min)

1. **Remy's story (6 min).** Read the story, showing each picture, and ask the question after each part.

   Part 1. Remy has a sore ear and feels poorly. Remy's grown-up gives Remy medicine on a spoon, the way the doctor said. After a few days Remy feels better. (Who gave Remy the medicine? A grown-up who looks after Remy.)

   Part 2. Remy asks, "Is medicine like sweets?" Remy's grown-up says, "No. Medicine is not sweets. You only have medicine when a grown-up who looks after you gives it to you." (Why does a grown-up give it? They know which medicine and how much.)

   Part 3. At a family party, Remy sees some small, bright tablets on a table. They look just like sweets. (What do you think Remy should do? Let children suggest.)

Part 4. Remy doesn't touch them and doesn't taste them. Remy finds a grown-up and says, "There are tablets on the table." The grown-up says, "Thank you for telling me," and puts them away, high up, out of reach. (How might Remy feel? Maybe proud, maybe a bit worried; both are fine.)

1. **The medicine rule (3 min).** Show the medicine rule card and say it together, with actions (hands behind back, lips closed, pointing to a grown-up): **"Medicine only from a trusted grown-up. If you find pills or a bottle you're not sure about: don't touch, don't taste, tell a grown-up."** "Some tablets look like sweets, and some medicines look like juice. That's why we tell a grown-up even if we think it's a sweet."
2. **OK or stop and tell? (6 min).** Show each scenario card; children show thumbs up for "OK" or a flat "stop" hand for "Stop and tell a grown-up", and a child places it under a label. (Answer guide in brackets.)
3. Remy is poorly and Remy's grown-up gives medicine on a spoon. (OK)
4. Small coloured tablets on a table. (Stop and tell)
5. A bottle of pink liquid on the floor that looks like a drink. (Stop and tell)
6. A child uses their own inhaler with a grown-up's help at school, as their plan says. (OK)
7. An older child says, "Try my medicine, it tastes nice." (Stop and tell: say "No" and tell a grown-up)
8. A packet of tablets falls out of a coat on the floor. (Stop and tell)
9. An open tub of chewy shapes that might be vitamins, on a low shelf. (Stop and tell: vitamins are not sweets either)
10. Remy has a cough and the grown-up who looks after Remy reads the label and gives the right amount. (OK)

✓ Discussion questions (5 min)

- "What is the same about all the OK cards?" (Answer guide: a trusted grown-up gave the medicine, or helped, as the plan said.)
- "Why should Remy tell a grown-up even if the tablets look like sweets?" (Answer guide: tablets can look like sweets; you can't always tell; a grown-up can check and put them away.)
- "Some children have an inhaler or medicine at school. Is that OK?" (Answer guide: yes; their family and the school have agreed it, and a grown-up helps. Do not name or point to any child.)

✓ Closing check (5 min)

Hold up scenario card 2 (tablets on a table): "What should Remy do?" Then: "Who gives us medicine?" Children answer together by saying the rule, showing the three actions or pointing to the medicine rule card; ask a few children individually. (Answer guide: don't touch, don't taste, tell a grown-up; a trusted grown-up gives medicine. Note on the class list.)

Vocabulary

medicine, tablet, pill, liquid, inhaler, trusted grown-up, don't touch, don't taste, tell a grown-up

Differentiation

- Support: learn only "don't touch, tell a grown-up" first; sort four cards instead of eight.
- Stretch: "What could a grown-up do so children don't find tablets?" (Answer guide: put medicines away high up and out of sight.)
- Non-speaking children: show the three actions, point to the rule card, or use signs or a communication device.
- Blind or low-vision children: explore the raised-line rule card; hear each scenario described.
- Children who use an inhaler or other medicine at school: the lesson treats it as normal and grown-up-agreed. Check the materials with their family or the school nurse beforehand if you think a child may feel singled out.

⚠ Safety

- No real medicines, bottles, inhalers, vitamins or sweets in class.
- Never call medicine sweets, even as a joke.
- Do not ask about medicines, illnesses or who looks after children at home. Say "a grown-up who looks after you", not "mum" or "dad".
- If a child says they have taken medicine they found, or anything worrying, act at once: follow your school's first-aid and medicine procedure (and safeguarding procedure if needed).

Teacher notes

- The source (Up and Away) advises teaching children "what medicine is and why you or another caregiver must be the one to give it", and never telling children medicine is candy. It also says pills can look like candy and liquid medicines like sugary drinks.
- Follow your school's medicine policy for anything it says differently (for example who gives medicine at school).
- Up and Away is about medicines; cleaning products and other things children shouldn't touch are not covered here.

Lesson 5: Asking for help

Unit overview - Previous: Lesson 4

Goal: Children name trusted grown-ups at school and practise asking for help: getting a grown-up's attention, saying or showing what is wrong, and asking another grown-up if the first one cannot help. A one-to-one check over the following days covers the whole unit.

Length: about 30 minutes, in the classroom, plus about 4 minutes per child for the one-to-one check in extra short slots.

Materials

- One large picture of Remy.
- Pictures or names of trusted grown-ups at school (the class teacher, teaching assistants, lunchtime staff, office staff, the school nurse if there is one), as your school allows.
- A large "how to ask for help" card with three pictures: 1 get their attention, 2 say what is wrong, 3 ask another grown-up.
- Five Remy scenario cards (drawn), listed in the main activity.
- One "I need help" card per child (a picture of a raised hand and the words), which children can hand or show to an adult.
- A class puppet (optional), for modelling.
- For the one-to-one check: the lesson 1 "fair" and "not fair" cards and two pictures (lanes with every hoop the same distance away; lanes with one hoop much closer); the lesson 2 "good sport" card; the lesson 3 small tooth picture (a clean copy); scenario card 2 from lesson 4 (tablets on a table); the pictures or names of trusted grown-ups; a class list.
- For blind or low-vision children: a raised-line copy of the "how to ask for help" card (a glue hand, a glue mouth, two glue figures); a raised-line "I need help" card (a glue hand); the textured tooth from lesson 3; the raised-line fair and not fair cards from lesson 1 and the raised-line medicine rule card from lesson 4, for the check.
- A class list for notes.

Steps

✎ Opening (5 min)

Sitting. "In term 2, Remy told a grown-up when a feeling got big. In lesson 4, Remy told a grown-up about the tablets. Today: who can we ask for help at school, and how?" Show the pictures or names of trusted grown-ups and name each job: "These are grown-ups whose job at school includes helping children." Children point to or name ones they know.

✎ Main activity (15 min)

1. **How to ask (4 min).** Show the "how to ask for help" card. The teacher (or the puppet) models each step:
2. **Get their attention:** go to the grown-up, then say "Excuse me", put your hand up, sign, or show your "I need help" card.

3. **Say or show what is wrong:** "I need help. My friend is hurt." / "I feel sick." / "I can't find my class." Pointing or showing the card is fine too.
4. **Ask another grown-up** if the first one is busy or can't help: "If the first grown-up can't help, ask another one." Model a muddled version ("Um... um...") and a clear one, and ask which was easier to understand.
5. **Remy scenarios (8 min).** Show each card. Children say who Remy could ask and what Remy could say. Volunteers may act it out with the teacher or puppet as the grown-up (opt-in; nobody has to perform; children can also point or show their card). (Answer guide in brackets.)
6. In the playground, Remy's friend falls over and hurts their knee. (Go to a playground grown-up: "Excuse me, I need help. My friend is hurt.")
7. Remy feels sick in class. (Tell the teacher or teaching assistant: "I feel sick.")
8. After assembly, Remy can't find the class line. (Stay in the hall and ask a school grown-up nearby: "I can't find my class.")
9. Remy sees tablets on the floor in the corridor. (Don't touch, don't taste; tell the nearest school grown-up.)
10. Remy asks a grown-up for help, but the grown-up is busy and says "Just a minute." Remy's friend is still hurt. (Say "It's important, my friend is hurt", or ask another grown-up.)
11. **Practise with the card (3 min).** Give each child an "I need help" card. In pairs, one child is the grown-up and one shows the card and says or shows one thing from the scenarios; then swap. Children keep the card in their tray or bag if your school agrees.

✓ Discussion questions (5 min)

- "Why is it a good idea to say what is wrong, not just 'help'?" (Answer guide: the grown-up knows what to do faster.)
- "What can you do if the first grown-up can't help?" (Answer guide: ask another grown-up; say "It's important".)
- "Which grown-ups at school could you ask?" (Answer guide: any trusted grown-up at school from the pictures; accept any school job.) Do not ask about grown-ups at home.

✓ Closing check (5 min)

Each child, in turn around the room or in small groups, shows the teacher how they would get a grown-up's attention and says or shows one thing they might need help with. (Answer guide: "Excuse me", a raised hand, a sign or the card; then any clear statement or showing such as "My friend is hurt". Note on the class list.)

One-to-one check (about 4 minutes per child, in extra slots)

Over the following days, in a quiet corner while the class reads or does choice time, check each child alone. Answers can be spoken, pointed, shown, signed or given on a communication device; agreed alternatives count fully.

1. **Fair or not fair?** Show the two lane pictures. "Which race is fair? Why?" (Answer guide: the one where every hoop is the same distance; in the other, one team has less far to go.) For a blind or low-vision child, describe the two set-ups aloud or use raised-line lane cards.

2. **Good game.** "Show me what a good sport does at the end of a game." (Answer guide: says "Good game" or "Well played", waves, thumbs-up or signs; any one counts.)
3. **Teeth.** Give the clean tooth picture (or the textured tooth). "Show me the outer, inner and chewing surfaces. How many times a day do we brush? For about how long? Should sugary snacks be big or small?" (Answer guide: points to all three; "twice"; "about two minutes" or "until the sand runs out"; "small". Two of three surfaces plus "twice" is a secure start.)
4. **Medicine.** Show the tablets card (and describe it aloud for a blind or low-vision child). "What should you do?" (Answer guide: don't touch, don't taste, tell a grown-up; "medicine only from a trusted grown-up".)
5. **Asking for help.** Show the pictures of grown-ups. "Who could you ask for help at school? What would you say if a friend was hurt?" (Answer guide: names or points to one trusted school grown-up; gets attention and says or shows what is wrong, for example "Excuse me, my friend is hurt".)

Record each part as secure, developing or not yet. Never record winning or losing, or anything about home.

Vocabulary

help, trusted grown-up, "Excuse me", "I need help", hurt, sick, lost, ask another grown-up

Differentiation

- Support: practise only step 1 and one sentence ("I need help"); use the card instead of speaking.
- Stretch: "What if you can't see any grown-up?" (Answer guide: go to where grown-ups usually are, such as the classroom or office; ask a friend to come with you.)
- Non-speaking children: the "I need help" card, signs or a communication device are a full answer; check the class sign or device page for "help" in advance.
- Blind or low-vision children: explore the raised-line cards; hear the scenario cards and staff pictures described (use staff names and voices).
- Deaf children: practise getting a grown-up's attention by going to them and showing the card or signing.

⚠ Safety

- No stranger-danger stories. The lesson is about asking trusted grown-ups at school.
- Role play is opt-in; nobody acts being hurt on the floor.
- Do not ask children about grown-ups, illnesses or incidents at home.
- If a child tells you something worrying, follow your school's safeguarding procedure.

Teacher notes

- Check the staff pictures with your school's photo rules; names alone are fine.
- Children may say "I'd tell my mum". Accept it warmly and add: "And at school, who could you tell?"

Grade 2 Health and PE: Balance, Rolling and Jumping (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 10 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check space, mats, footwear, medical and contact notes against your school's rules and PE guidance.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 1. Builds on grade 1: Moving and dodging: travelling, warming up and safe tag (the class warm-up and the stop signal) and kindergarten Balance, jumping, ball skills and feelings words (first balances and two-foot jumps)

Big idea

We can balance on many different parts of our body, at high, middle and low levels, and hold still like a statue. We can move our weight from our feet onto other body parts, roll sideways in a long thin shape or a small curled shape, and jump and land softly. Joining a balance, a move and another balance makes a short floor sequence with a clear start and finish.

This is the first health and PE unit of the grade 2 year (term 1). In kindergarten children tried first balances and two-foot jumps with soft landings, and in grade 1 they built a class warm-up and travelled in many ways. Term 2 of grade 2 moves on to hitting and passing, and term 3 to healthy habits and a class game day.

Outcomes

By the end of the unit a student can:

1. Hold a still balance on at least three different bases of support (for example one foot, two hands and two feet, bottom only, knees and hands), at more than one level, and name the body parts touching the mat.
2. Show and tell apart a curl, a stretch, a twist and a bend.
3. Move their weight from their feet onto other body parts (for example rocking, a "bear walk", or sitting down and rolling) and roll sideways in a long thin "pencil" shape and a small curled "egg" shape, in their own way.
4. Jump and land softly with bent knees: forwards (horizontal) and upwards (vertical), taking off and landing on two feet and trying one-foot take-offs and landings.
5. Make and show a three-part floor sequence (balance - move or roll - balance) with a clear still start and finish, and follow the mat rules (one at a time on a mat, wait off the mat, nobody in a landing zone).
6. Say that our class warm-up starts gently and gets faster and gets our bodies ready, and lead one move of it.

Prior knowledge

- From kindergarten: "my bubble" space, freezing on the stop signal, simple balances and two-foot jumps with soft landings.

- From grade 1: the class warm-up (march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently), the travelling words, high and low.
- Seven-year-olds vary a lot in balance, strength and confidence. Some will already do gymnastics outside school; others will be new to mats. Praise stillness, control and trying, not difficulty, and accept each child's own way of moving.

Lessons

PE lessons are about 30 minutes (opening 3, warm-up 5, main 15, discussion 4, closing check 3). Leave a day or two between lessons. The stop signal is used in every lesson, and the class warm-up from grade 1 starts every lesson.

Lesson	Title	Main activity
1	Statues on the mats	Mat rules; balancing on different bases, at three levels, in different shapes
2	Curl, stretch, twist, bend	Shape cards; rocking and moving weight onto other body parts
3	Pencil roll and egg roll	Sideways rolls in a narrow or curled shape, both directions
4	Jump and land like a cat	Forward and upward jumps; one- and two-foot take-offs and landings
5	Our floor sequence	Balance - move or roll - balance, shown to a partner; one-to-one check

Materials (whole class unless noted)

- A hall or cleared indoor space with a non-slip floor, at least a couple of metres from walls and furniture. Cones or floor spots to mark the edge.
- Gymnastics or PE mats: about one mat per two or three children, laid with clear gaps (at least a metre) between mats and away from walls (every lesson).
- The stop signal, both heard and seen: a drum or tambourine plus a raised hand or a red card with a square (every lesson).
- The six grade 1 warm-up cards (march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently) (every lesson).
- A large "mat rules" card with pictures: one at a time on the mat; wait sitting at the end of the mat; nobody on the mat while someone is moving; bare feet or gym shoes, no socks (every lesson).
- A class list for notes (every lesson). Water available in every lesson.
- Ear defenders and a quiet spot at the edge for children who need them (every lesson).
- Lesson 1: three large level cards (high, middle, low) each with a stick picture and one, two or three dots from the floor so they can be read without colour; eight balance cards with a stick picture and the body parts touching the floor written underneath (one foot; two feet tiptoe; two hands and two feet; two knees and two hands; one knee and one hand; bottom only; tummy only, arms and legs lifted; one hand and one foot, side on); beanbags, one per child; blank small cards and pencils for early finishers.
- Lesson 2: four large shape cards with a word and a stick picture (curl, stretch, twist, bend); the balance cards and level cards from lesson 1.
- Lesson 3: the shape cards; a soft toy or rolled-up towel per mat as a "start spot" marker; floor tape or chalk to mark each mat's rolling lane.
- Lesson 4: about 12 floor spots or hoops for take-off spots; floor tape or chalk to mark a "landing zone" on each mat (a box drawn at the far end); a large "cat landing" card (stick

picture: knees bent, arms forward, feet apart, quiet); about 16 small cones or beanbags to mark how far jumps go (no measuring tapes, no recording distances).
- Lesson 5: the balance, level and shape cards; a "my sequence" card per child with three empty boxes (start balance, move or roll, finish balance) and pencils; the cat landing card.
- For blind or low-vision children: a sighted guide partner (every lesson); raised-line (dried glue) copies of the four shape cards and the "my sequence" card; a small bell or shaker for the guide to show where the mat starts and ends.

⚠ Safety and access

- **Mats and space:** check the floor, mats and space before each lesson. Mats lie flat with no gaps or overlaps between pieces in a lane. Bare feet or gym shoes, as your school allows; no socks on a slippery floor. Hair tied back; no jewellery; pockets empty.
- **One at a time:** only one child moves on a mat at a time. Others sit at the end of the mat and wait. Nobody stands or sits in a landing zone or rolling lane.
- **Rolls:** this unit teaches sideways rolls only (pencil roll and egg roll). Forward and backward rolls are not taught or asked for; a child who already does them outside school is asked to save them for a club or a coached session. No weight on the head or neck in any balance or roll.
- **Opt-in:** every balance, roll and jump is an invitation. Children choose how big to go, can do a smaller version, or can rest at the edge, with no reason needed. Never physically push or place a child into a shape.
- **Hands-on help:** if an adult needs to steady a child, ask first ("Can I hold your hand to help you balance?") and help only at the hand or shoulder.
- **Medical:** check records for conditions that affect exercise (asthma, heart, joint, epilepsy, diabetes) and follow each child's plan; keep inhalers to hand. Some children are told by their doctor not to roll, jump or go upside down; they choose from the other balances and moves.
- **Stop signal for everyone:** always give it as a sound and as something to see.
- **Moving in your own way:** children who use a wheelchair, walker or crutches balance in their chair (for example one arm lifted, leaning in a shape, a twist or a stretch with the arms), move their weight by leaning and shifting, and make their sequence from their own balances and moves; a child may also choose to come out of the chair onto a mat with their school's agreed support. "Your own way counts" is said in every lesson. Blind or low-vision children work with a sighted guide partner and can feel raised-line shape cards; deaf children get every instruction shown as well as said.
- **Bodies:** never measure, weigh or compare children's bodies; jump markers show "further than last time" for each child only and are never recorded or ranked.

Assessment

- Lessons 1-4: the teacher watches for still balances on different bases and levels, telling curl, stretch, twist and bend apart, sideways rolls with control, soft landings with bent knees, and following the mat rules, and notes it on a class list.
- Lesson 5: a one-to-one check with five parts and an answer guide (about 4 minutes per child), done while the class practises sequences. Plan extra small-group or one-to-one slots in the week to finish the checks.

Sources

- SHAPE America, "Grade-Level Outcomes for K-12 Physical Education" (2013), read 10 November 2026; quotations checked against page images: https://www.shapeamerica.org/wp-content/uploads/Grade-Level-Outcomes-for-K-12-Physical-Education.pdf
- S1.E7.2a: "Balances on different bases of support, combining levels and shapes."
- S1.E7.2b: "Balances in an inverted position* with stillness and supportive base." The footnote says: "*Teachers must use differentiated instruction and developmentally appropriate practice tasks for individual learners when presenting transfers of weight from feet to other body parts."
- S1.E8.2: "Transfers weight from feet to different body parts/bases of support for balance and/or travel."
- S1.E9.2: "Rolls in different directions with either a narrow or curled body shape."
- S1.E10.2: "Differentiates among twisting, curling, bending and stretching actions."
- S1.E11.2: "Combines balances and transfers into a three-part sequence (i.e., dance, gymnastics)."
- S1.E3.2: "Demonstrates 4 of the 5 critical elements for jumping and landing in a horizontal plane using a variety of one- and two-foot takeoffs and landings."
- S1.E4.2: "Demonstrates 4 of the 5 critical elements for jumping and landing in a vertical plane."
- S4.E4.2: "Works independently with others in partner environments."
- S4.E6.2a: "Works independently and safely in physical education."
- S4.E6.2b: "Works safely with physical education equipment."
- Warm-up and cool-down outcomes (S3.E4) first appear in grade 3 in this document.
- Wikipedia, "Warming up" (read 9 November 2026, for the grade 1 unit): https://en.wikipedia.org/wiki/Warming_up
- The grade 2 year plan (health and PE, term 1).

Known gaps

- One other agent (Gemini 4 Argon, at 7ab4714) text-checked this unit on 2026-11-10 and reported no errors. That is a text check by an AI agent, not a teacher review or classroom test.
- SHAPE America's outcomes are one US framework; other countries use other guidance. The unit quotes the outcomes but is not a full alignment.
- The "critical elements" for jumping and landing are not listed in the outcomes document, so the unit uses its own simple checklist (bent knees to start, arms swing, take off, land on the balls of the feet then heels, knees bend to land quietly). That checklist is an example, not from a source.
- **Inverted balance (S1.E7.2b) is only partly covered.** Lesson 2 offers "hips higher than head" shapes (bear shape and "mountain" with hands and feet on the mat) as an optional try; headstands, handstands and shoulder stands are not taught. A school with trained gymnastics staff may want to go further.
- Forward and backward rolls are left out on purpose (see Safety and access); SHAPE's grade 2 outcome asks for rolls "in different directions" and the unit covers left and right sideways rolls only.
- The warm-up is our class routine from grade 1, not a grade 2 outcome in the source (warm-up outcomes start in grade 3 there).
- Pacing is untested; classes new to mats may need two sessions for lesson 3.

- The order of lessons, the games, the balance list and the timings are my choice, not taken from a source.

Lesson 1: Statues on the mats

Unit overview - Next: Lesson 2

Goal: Children learn the mat rules and hold still balances on different bases of support, at high, middle and low levels.

Length: about 30 minutes.

Materials

- The cleared space, edge cones or floor spots, and mats (about one per two or three children) with clear gaps between them.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- The large "mat rules" card.
- Three large level cards (high, middle, low), with one, two or three dots.
- Eight balance cards with the body parts touching the floor written underneath: one foot; two feet tiptoe; two hands and two feet; two knees and two hands; one knee and one hand; bottom only; tummy only, arms and legs lifted; one hand and one foot, side on.
- Beanbags, one per child.
- Blank small cards and pencils for early finishers.
- For blind or low-vision children: a sighted guide partner and a bell or shaker to mark the mat ends.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge. Show the mat rules card and read each picture together: one at a time on the mat; wait sitting at the end; nobody on the mat while someone is moving; bare feet or gym shoes, no socks. "Why do we have these rules?" (So nobody bumps or slips.) Say: "This term we are going to be statues, rollers and jumpers. Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1 with the six cards: march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently. Ask a child to hold up each card. Freeze on the stop signal.

✎ Main activity (15 min)

1. **Statue game (4 min).** Children walk around the space (not on the mats). On the stop signal they freeze as a statue and hold for a count of five. "Which parts of you are

touching the floor?" (Usually two feet.) "That is your base. Now freeze with a different base." Try one foot, two knees and two hands, bottom only.

2. **Balance cards at the mats (6 min).** Two or three children per mat, one at a time on the mat. Show a balance card; each child tries it and holds for five, then sits at the end for the next child. Use four or five of the eight cards. "Point to the parts touching the mat." Children in a wheelchair make balances in their chair: lifting one arm, leaning to the side, a stretched or curled shape with the arms.
3. **High, middle, low (5 min).** Show the level cards. "High is up tall, low is near the floor, middle is in between." Call a level and a base: "Low balance on bottom only", "High balance on one foot", "Middle balance on two hands and two feet". Stretch: balance a beanbag on a body part while holding still.

✓ Discussion questions (4 min)

- "What helped you hold still?" (Answer guide: looking at one spot, a wide base, tight tummy, arms out; accept sensible ideas.)
- "Is it easier to balance on lots of parts or on one part? Why?" (Answer guide: usually lots of parts, because the base is bigger; accept sensible ideas.)

✓ Closing check (3 min)

Show the balance card "one knee and one hand". "Which parts touch the mat? What level is it, high, middle or low?" Children point or say. (Answer guide: one knee and one hand; low or middle, depending on the shape - accept either with a reason. Note who names the base correctly.)

Vocabulary

balance, still, statue, base, high, middle, low, mat rules

Differentiation

- Support: balances with a bigger base (two knees and two hands, bottom only); hold for a count of three; an adult holds a hand if the child asks.
- Stretch: balance a beanbag on a body part; change level without losing stillness.
- Early finishers: invent a new balance and draw its base on a blank card.

⚠ Safety

- One at a time on each mat; others sit at the end, never in the lane.
- No weight on the head or neck in any balance.
- Children may choose a smaller version of any balance or rest at the edge.
- Water available; children with asthma follow their plan.

Teacher notes

- Praise stillness and control rather than hard balances.
- Keep the mat rules card up for every lesson of the unit.

Lesson 2: Curl, stretch, twist, bend

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children show and tell apart a curl, a stretch, a twist and a bend, and move their weight from their feet onto other body parts.

Length: about 30 minutes.

Materials

- The cleared space, edge cones or floor spots, and mats with clear gaps.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- The large "mat rules" card.
- Four large shape cards with a word and a stick picture: curl, stretch, twist, bend.
- The eight balance cards and three level cards from lesson 1.
- For blind or low-vision children: a sighted guide partner and raised-line copies of the four shape cards.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting. Read the mat rules card together. Show the four shape cards one at a time and make each shape sitting down: curl (small and round like a ball), stretch (long and wide, reaching far), twist (one part turns while another stays still, like wringing a cloth), bend (fold at a joint, like an elbow or a knee).

Warm-up (5 min)

The class warm-up with the six cards, led by a child holding the cards. Freeze on the stop signal.

✎ Main activity (15 min)

1. **Shape caller (4 min).** Children spread out in their own space. Call a shape: everyone makes it, then freezes on the stop signal. Mix with levels: "a low curl", "a high stretch", "a middle twist". Children in a wheelchair make each shape with their arms, head and upper body.
2. **Rock and roll over the feet (5 min).** At the mats, one at a time. Show three ways to move weight from feet to other parts:
3. Crouch, then rock back onto your bottom and curved back, and rock up onto your feet again (a "rocking egg"). Chin stays tucked; weight never goes onto the head or neck.
4. From standing, put your hands on the mat and walk your feet around them (a "bear walk" on hands and feet).

5. From standing, kneel down, sit, and lie on your side in a long shape. "Where is your weight now?" after each one.
6. **Hips-high shapes (optional, 3 min).** "Can you make a shape where your hips are higher than your head?" Show two: a bear shape (hands and feet on the mat, hips high, knees bent or straight) and a "mountain" (hands and feet on the mat, hips pushed up to a point). Hold for a count of three, then lower the knees to the mat. Head stays off the mat; no weight on the head or neck. Any child can choose a balance card instead.
7. **Balance, move, balance taster (3 min).** Each child picks one balance card, holds it, moves their weight to a new base in any way from step 2, and holds a new balance.

✓ Discussion questions (4 min)

- "What is the difference between a twist and a bend?" (Answer guide: in a twist one part turns around while another stays facing the same way; in a bend a joint folds; accept a demonstration.)
- "How did you get from your feet to your bottom without bumping?" (Answer guide: going low first, bending the knees, using hands, rocking slowly.)

✓ Closing check (3 min)

Make three shapes yourself, one at a time: a curl, a twist, a stretch. After each, children hold up the matching shape card or say the word. (Answer guide: curl, twist, stretch. Note who tells the twist apart from the bend.)

Vocabulary

curl, stretch, twist, bend, weight, rock, hips, base

Differentiation

- Support: practise only curl and stretch first; rock with an adult's hand held if the child asks.
- Stretch: a curl at a high level or a twist on one foot; link two shapes smoothly.
- Early finishers: show a partner a shape and let them guess which word it is.

⚠ Safety

- Rocking: chin tucked; roll on the curved back only, never onto the head or neck.
- Hips-high shapes are optional and held only briefly; no headstands, handstands or shoulder stands in this unit.
- One at a time on each mat; others sit at the end.
- Water available; children with asthma follow their plan.

Teacher notes

- The SHAPE America grade 2 outcomes include an inverted balance and say teachers must use differentiated, developmentally appropriate tasks for each learner. This lesson offers only gentle hips-high shapes; see the unit's Known gaps.

Lesson 3: Pencil roll and egg roll

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children roll sideways in both directions, in a long narrow shape (pencil roll) and a small curled shape (egg roll), with control.

Length: about 30 minutes.

Materials

- The cleared space, edge cones or floor spots, and mats with clear gaps.
- Floor tape or chalk to mark each mat's rolling lane.
- A soft toy or rolled-up towel per mat as a "start spot" marker.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- The large "mat rules" card.
- The four shape cards from lesson 2 (curl, stretch, twist, bend).
- For blind or low-vision children: a sighted guide partner, raised-line shape cards, and a bell or shaker to mark the mat ends.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting. Read the mat rules card together, especially "nobody on the mat while someone is moving". Hold up the stretch and curl cards. "Today we roll in a stretched shape and in a curled shape. We roll sideways, like a log rolling down a hill. We do not do forward rolls in this unit."

Warm-up (5 min)

The class warm-up with the six cards. Add two moves on the mat edge: lying on the back, rock gently side to side; then hug the knees and rock side to side.

✎ Main activity (15 min)

1. **Pencil roll (5 min).** One child at a time lies at the start spot on their back, arms stretched above the head (or by the sides), legs together, body long and straight like a pencil. Roll sideways along the lane to the end of the mat, then roll back the other way. "Try to stay in the lane and stay straight." The child sits at the end; the next child goes.
2. **Egg roll (5 min).** Kneel and curl up small, tummy on the knees, hands holding the shins or tucked in, head tucked. Tip sideways onto the side and back and over to the knees again, rolling along the lane. Then try the other direction.

3. **Choose and change (5 min).** Each child chooses pencil or egg roll and which direction (towards the window, towards the door), says it out loud or signs it, then does it. Partners at the end of the mat watch and say one thing they saw: "You stayed straight", "You stayed curled".

Children who do not want to roll can rock side to side in a pencil or egg shape on the spot. Children in a wheelchair, or who choose not to leave the chair, make a long thin shape and a small curled shape with the upper body and lean from side to side; with their school's agreed support they may also roll on a mat.

✓ Discussion questions (4 min)

- "Which roll was easier to keep straight? Why?" (Answer guide: any answer with a reason; many find the pencil roll drifts and the egg roll is slower.)
- "What does your body look like in a pencil roll and in an egg roll?" (Answer guide: long and narrow, stretched; small and curled.)

✓ Closing check (3 min)

Ask one child at a time, quickly at the mat: "Show me a pencil roll to the window side" or "Show me an egg roll to the door side". (Answer guide: the right shape (long and narrow, or small and curled) and the right direction. Children who rock instead of roll show the shape and direction by rocking. Note shape and direction on the class list.)

Vocabulary

roll, sideways, pencil roll, egg roll, narrow, curled, direction, lane

Differentiation

- Support: rock in the shape before rolling; an adult kneels beside the lane (not in it) to give a direction cue.
- Stretch: pencil roll with arms above the head and feet together the whole way; link a pencil roll into a balance.
- Early finishers: hold the start spot marker and judge "straight" for a partner.

⚠ Safety

- Sideways rolls only; no forward or backward rolls.
- One child in a lane at a time; the next child waits until the roller is sitting at the end.
- Children who feel dizzy sit still at the edge until it passes; stop after a few rolls each.
- No weight on the head or neck.

Teacher notes

- The SHAPE America grade 2 outcome asks for rolls "in different directions with either a narrow or curled body shape." This lesson uses two sideways directions only.
- Lay the lanes so rollers move away from walls and other mats.

Lesson 4: Jump and land like a cat

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children jump forwards and upwards and land softly, using a five-point checklist, with two-foot and one-foot take-offs and landings.

Length: about 30 minutes.

Materials

- The cleared space, edge cones or floor spots, and mats with clear gaps.
- About 12 floor spots or hoops as take-off spots.
- Floor tape or chalk to mark a "landing zone" box at the far end of each mat.
- A large "cat landing" card (stick picture: knees bent, arms forward, feet apart, quiet).
- About 16 small cones or beanbags to mark how far a jump went.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- The large "mat rules" card.
- For blind or low-vision children: a sighted guide partner and a bell or shaker sounded from the side of the landing zone.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting. Show the cat landing card. "How does a cat land when it jumps down? Quietly, with bent legs." Teach the five-point jump checklist with actions (this checklist is our own, not from a source):

1. Bend your knees and swing your arms back.
2. Swing your arms forwards and up.
3. Push off and stretch in the air.
4. Land on the front of your feet, then your heels.
5. Bend your knees to land quietly and freeze.

Warm-up (5 min)

The class warm-up with the six cards, then small bunny hops on the spot, landing quietly.

✎ Main activity (15 min)

1. **Upward jumps (4 min).** In their own space (not on mats). "Jump up as if to touch the ceiling, land like a cat and freeze for three." Try five jumps, checking one point of the checklist at a time.

2. **Forward jumps onto the mat (6 min).** Each mat has a take-off spot just in front of it and a landing zone box at the far end. One child at a time jumps forwards from two feet, lands on two feet on the mat, freezes, then walks off to the side, never back through the landing zone. A partner at the side places a cone or beanbag where they landed. "Can you jump past your own marker next time?" Markers are each child's own and are not compared or written down.
3. **One foot, two feet (5 min).** Try new combinations, one at a time on the mat: two feet to two feet; one foot to two feet (a "leap and land"); one foot to the same foot (a hop); one foot to the other foot (a leap). Children choose which to try. Landing always ends in a quiet, still freeze.

Children in a wheelchair can do a "chair jump": a quick push forward and a controlled stop that freezes still, or a fast arm-swing-and-reach upward with a still finish. Children who choose not to jump do a big step-and- freeze onto the mat.

✓ Discussion questions (4 min)

- "Why do we bend our knees when we land?" (Answer guide: to land softly and quietly, so the landing does not jolt; accept sensible ideas.)
- "Which take-off and landing felt steadiest for you?" (Answer guide: any answer; often two feet to two feet.)

✓ Closing check (3 min)

Two or three children at a time jump upwards in their own space while you watch for four of the five checklist points. (Answer guide: note which points each child shows; four or more of the five meets the goal - for example knees bent, arm swing, push off, quiet bent-knee landing. Children who use a chair or step show a controlled push or step and a still finish.)

Vocabulary

jump, land, take off, upwards, forwards, one foot, two feet, quiet, freeze

Differentiation

- Support: small jumps from a low line on the floor; hold an adult's hand if the child asks.
- Stretch: a forward jump with a quarter turn in the air; a hop and land still on one foot.
- Early finishers: be the partner who places the landing marker and watches one checklist point.

⚠ Safety

- Only one child on a mat; nobody stands, sits or walks in a landing zone.
- Leave the mat by the side, never back through the landing zone.
- Jumping on mats or in own space only; no jumping off benches or boxes in this unit.
- Markers are never measured, compared or recorded.

- Water available; children with asthma follow their plan.

Teacher notes

- SHAPE America's grade 2 outcomes ask for 4 of the 5 "critical elements" of jumping and landing, horizontally and vertically, but the outcomes document does not list the five elements. The checklist above is my own example.

Lesson 5: Our floor sequence

Unit overview - Previous: Lesson 4

Goal: Children make, practise and show a three-part floor sequence (balance - move or roll - balance) with a still start and finish; the teacher does a one-to-one check.

Length: about 30 minutes.

Materials

- The cleared space, edge cones or floor spots, and mats with clear gaps.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- The large "mat rules" card.
- The eight balance cards, three level cards and four shape cards.
- The cat landing card.
- A "my sequence" card per child with three empty boxes (start balance, move or roll, finish balance) and pencils.
- For blind or low-vision children: a sighted guide partner and a raised-line "my sequence" card (three glue-line boxes) with the balance chosen said aloud and remembered by the guide.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes, with space for the one-to-one check.

Steps

✎ Opening (3 min)

Sitting. Show the three-box "my sequence" card. "A sequence is like a sentence: a start, a middle and an end. We start still in a balance, move or roll, and finish still in a balance." Show one example yourself: a high balance on one foot, kneel down and pencil roll, a low balance on bottom only. Freeze for three at the start and the end.

Warm-up (5 min)

The class warm-up with the six cards, led by two children. Finish with two quiet cat jumps.

✎ Main activity (15 min)

1. **Plan (4 min).** Each child draws or chooses cards for the three boxes: a start balance, a move or roll (rocking egg, bear walk, pencil roll, egg roll, a cat jump, or their own way), and a finish balance at a different level. Children who prefer not to draw place the cards in order on the floor.
2. **Practise (5 min).** At the mats, one at a time, children practise their sequence two or three times. Remind: freeze for three at the start, freeze for three at the end.

3. **Show a partner (6 min).** Partners take turns: one shows, the other watches and says one thing they liked and names the shapes or levels they saw ("You were still at the start", "Your finish was low and curled"). While the class practises and shows, the teacher does the one-to-one checks below.

Children in a wheelchair make their sequence from chair balances, a lean or shift and another balance (or on a mat with their school's agreed support). "Your own way counts."

✓ Discussion questions (4 min)

- "What made a sequence easy to watch?" (Answer guide: a clear still start and finish, moving smoothly, different levels or shapes.)
- "How did you keep safe on the mat?" (Answer guide: one at a time, waiting at the end, nobody in the lane or landing zone.)

✓ Closing check (3 min)

Each child shows their sequence card to a partner and says the three parts in order. Children who use cards on the floor point to them in order. (Answer guide: start balance, move or roll, finish balance. Note who can give all three in order.)

One-to-one check (about 4 minutes per child)

Done at a mat, during the practise and show time and in extra slots in the week. A child may show any part their own way.

1. **Balance:** "Show me a still balance on a base that is not your two feet. Which parts are touching the mat?" (Answer guide: holds still for about three seconds; names the base, for example two knees and two hands.)
2. **Level:** "Now show me a balance at a different level." (Answer guide: a clear change between high, middle and low.)
3. **Shapes:** "Show me a curl, then a twist." (Answer guide: small and round; one part turning while another stays still.)
4. **Roll or move:** "Show me a pencil roll or an egg roll, either way." (Answer guide: the matching narrow or curled shape, rolling sideways with control. Children who do not roll show weight moving from feet to another base, for example a rocking egg or a bear walk.)
5. **Jump and land:** "Show me a jump and a cat landing." (Answer guide: at least four of the five checklist points from lesson 4, ending in a still, quiet freeze. Children who use a chair show a controlled push and a still stop.)

Record on the class list what each child showed. Do not record anything a child chose not to try; offer it again another day.

Vocabulary

sequence, start, middle, finish, still, smooth, level, partner

Differentiation

- Support: a two-part sequence (balance - roll) or cards placed ready; an adult walks through it with the child first.
- Stretch: add a change of level and shape inside the move; show it without stopping between parts.
- Early finishers: teach their sequence to a partner and do it side by side on separate mats.

⚠ Safety

- One at a time on each mat; partners watch from the end, never in the lane or landing zone.
- Sideways rolls only; no weight on the head or neck.
- Children may change any part of their sequence to a smaller or easier version at any time.
- Water available; children with asthma follow their plan.

Teacher notes

- SHAPE America's grade 2 outcome: "Combines balances and transfers into a three-part sequence (i.e., dance, gymnastics)." This lesson uses a gymnastics-style floor sequence.

Grade 2 Health and PE: Hitting and Passing (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 11 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check space, equipment, latex and medical notes against your school's rules and PE guidance.
>
> Text-checked by two other agents (Gemini 4 Carbon and Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 2. Builds on grade 2 term 1 Balance, rolling and jumping (working safely in our own space) and grade 1 Throwing, catching, kicking and calm-down (sending and receiving a ball with a partner)

Big idea

We can hit a light object with a flat open hand, with a short paddle and with a bat. A good hit starts with watching the object, a flat hitting surface and a firm wrist. We can keep a balloon up with hits in a row, send it to a partner so they can hit it back, and keep it going together as a small team. Hitting games need space and safe waiting places, and when we disagree in a game we can stop, say what we saw and choose a fair way to carry on.

This is the second health and PE unit of the grade 2 year (term 2). In grade 1 children threw, caught and kicked with a partner; in term 1 of grade 2 they worked safely in their own space on mats. Term 3 (planned) moves on to healthy habits and a class game day.

In this unit "passing" means sending a balloon or soft ball to a partner or team-mate by hitting it with a hand or paddle. Passing and receiving with the feet is left for grade 3 (see Sources and Known gaps).

Outcomes

By the end of the unit a student can:

1. Hit a balloon upward with an open, flat hand several times in a row (consecutive hits), in their own space, watching the balloon.
2. Hit a balloon, and then a soft ball, upward with a short paddle several times in a row, keeping the paddle face flat and the wrist firm.
3. Pass a balloon to a partner with a gentle hit so the partner can hit it back, and keep a balloon up with a small team, taking turns and calling "mine".
4. Hit a soft ball off a tee or tall cone with a light bat, holding the bat with both hands together and standing side-on to the tee.
5. Follow the hitting-space rules (own space, waiting line, bats are put down not thrown, collect only on the signal) and say one fair way to sort out a disagreement in a game.

Prior knowledge

- From kindergarten and grade 1: "my bubble" space, the stop signal, the class warm-up, throwing and catching with a partner, taking turns.
- From grade 2 term 1: working on your own spot, waiting at the edge, nobody in someone else's landing zone.
- Seven-year-olds vary a lot in hand-eye coordination. Some will already play bat-and-ball games outside school; others will find tracking a ball hard. Balloons are slow on purpose. Praise watching, a flat hitting surface and trying again, not the number of hits.

Lessons

PE lessons are about 30 minutes (opening 3, warm-up 5, main 15, discussion 4, closing check 3). Leave a day or two between lessons. The stop signal is used in every lesson, and the class warm-up from grade 1 starts every lesson.

Lesson	Title	Main activity
1	Balloon keep-up	Open-palm hits upward, hits in a row; first gentle passes to a partner
2	Paddle and balloon	Flat paddle face, firm wrist; hits in a row with a paddle; partner passes with paddles
3	Team keep-up and fair play	Small-team balloon keep-up; calling "mine"; sorting out a disagreement (made-up characters)
4	Batting off a tee	Grip, side-on stance and a level swing; batting box and waiting line
5	Hitting stations	Three stations with class-made rules; one-to-one check

Materials (whole class unless noted)

- A hall or cleared indoor space (or a flat outdoor area with no wind for balloons) with a non-slip floor, well away from walls, windows and lights. Cones or floor spots to mark the edge.
- About 30 floor spots or hoops, one per child, laid at least 3 metres apart so a swinging arm or paddle cannot reach a neighbour (every lesson).
- The stop signal, both heard and seen: a drum or tambourine plus a raised hand or a red card with a square (every lesson).
- The six grade 1 warm-up cards (march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently) (every lesson).
- **Latex-free** balloons, about one per child plus spares, blown up by an adult to about the size of a child's head (lessons 1, 2, 3 and 5). A lidded box for any burst balloon pieces (every balloon lesson).
- A few light beach balls or very light foam balls as a slower or non-balloon option (lessons 1, 2, 3 and 5).
- Short-handled light paddles, one per child: foam paddles, or paper plates with a wide wooden craft stick taped firmly to the back as a handle (lessons 2, 3 and 5). A few paddles with a hand strap and one or two longer-handled light paddles for children who need them.
- Soft foam balls about tennis-ball size, one per pair (lessons 2 and 5).
- For lesson 4 and the batting station in lesson 5: two to four batting tees or tall cones; light foam or plastic bats with a wide barrel; large soft foam balls (about the size of a grapefruit), six per tee; floor tape or chalk to mark a batting box and a waiting line beside each tee; a collecting bucket per tee; a big cone as a target for children who want a challenge; a

"collect" card (a green card with a circle); a safety circle about 2 metres across around each batting box, marked with tape or chalk.
- Rolled-up newspaper "bats" or pool-noodle pieces, one per child, for practice swings without a ball (lesson 4 and the lesson 5 check).
- Large picture cards: "good hit" (eyes on the object, flat hand or paddle, firm wrist); "bat grip" (hands together, one above the other, knuckles lined up); "side-on" (stick figure with shoulder pointing at the target) (lessons 1-5 as listed in each lesson).
- A "hitting space" rules card: stay on your spot; wait behind the line; put the bat down, never throw it; collect only on the green card (lessons 4 and 5).
- Lesson 3: four "game trouble" picture cards with made-up characters from Little Hill (see lesson 3) and a "fair ways" card (stop; say what you saw; listen; choose: do it again, take turns, or ask the referee).
- Lesson 5: a large blank card and a thick pen for the class's own station rules; three station signs with pictures (team keep-up, paddle keep-up, tee batting).
- A class list for notes (every lesson). Water available in every lesson.
- Ear defenders and a quiet spot at the edge for children who need them; balloons can burst with a bang (every lesson).
- For blind or low-vision children: a sighted guide partner (every lesson); a brightly coloured large balloon with a small bell or a few dried beans inside, put in by an adult before blowing up, so it can be heard; a beeping or bell ball or a larger bright foam ball on the tee; raised-line (dried glue) copies of the "good hit" and "bat grip" cards.

⚠ Safety and access

- **Space:** every child works on their own spot or hoop, at least 3 metres from the next. Before each lesson check that no paddle or bat can reach a wall, window, light or radiator. Hair tied back; no jewellery; pockets empty; shoes as your school allows.
- **Latex and balloons:** use latex-free balloons only and check records for latex allergy. An adult blows up and ties every balloon; children do not blow up balloons or chew them. Burst pieces go straight into the lidded box because they are a choking risk; children tell an adult and do not pick them up. Warn the class that a balloon may go "bang"; offer ear defenders before balloon lessons.
- **Bats:** only light foam or plastic bats. One child bats at a time at each tee, inside the batting box. Everyone else waits behind the waiting line, which is behind the batter's safety circle, never in front. The bat is put down in the box after each hit (never thrown or swung while walking). Balls are collected only when the adult shows the green "collect" card and nobody is holding a bat. Only the batter goes inside a safety circle about 2 metres across, and the waiting line is at least 4 metres behind it, so it is out of reach whichever side a child bats from (see lesson 4).
- **Paddles:** paddles stay below head height of anyone nearby; no hitting towards a person's face; no swinging paddles while walking between spots. Check taped paper-plate paddles for loose tape or splinters before use.
- **Opt-in:** every task is an invitation. Children choose to use a balloon, a slower beach ball or a soft ball, choose how many hits to try, and can rest at the edge, with no reason needed. Never physically move a child's arm without asking first ("Can I hold your hand on the bat to show you?").
- **Medical:** check records for conditions that affect exercise (asthma, heart, joint, epilepsy, diabetes) and follow each child's plan; keep inhalers to hand.

- **Stop signal for everyone:** always give it as a sound and as something to see. On the stop signal, children catch or hold their balloon or ball, put paddles and bats on the floor, and freeze.
- **Moving in your own way:** a child who uses a wheelchair or walker hits a balloon from their chair, hits a ball off a tee set at chair height, or uses a longer-handled light paddle; partners pass to reach them. A child who cannot grip a paddle can use a paddle with a hand strap, a balloon on a short string held by a partner, or an open-hand hit. "Your own way counts" is said in every lesson. Blind or low-vision children use a sound balloon or bell ball with a sighted guide partner who calls "now"; deaf children get every instruction shown as well as said.
- **Counts are private:** children may count their own hits in a row, but the numbers are never recorded, shown or compared. "Beat your own best" is the only challenge.

Assessment

- Lessons 1-4: the teacher watches for watching the object, a flat hand or paddle face, hits in a row, gentle passes a partner can return, a hands-together grip and a side-on stance at the tee, and following the hitting-space rules, and notes it on a class list.
- Lesson 5: a one-to-one check with five parts and an answer guide (about 3 minutes per child), done while the class works at stations. Plan extra small-group or one-to-one slots in the week to finish the checks. Each part is marked yes / with help / not yet. The number of hits is never part of the mark.

Sources

- SHAPE America, "Grade-Level Outcomes for K-12 Physical Education" (2013), read 10 and 11 November 2026; quotations checked against page images: https://www.shapeamerica.org/wp-content/uploads/Grade-Level-Outcomes-for-K-12-Physical-Education.pdf
- S1.E22.2 (volleying, underhand): "Volleys an object upward with consecutive hits."
- S1.E24.2 (striking, short implement): "Strikes an object upward with a short-handled implement, using consecutive hits."
- S1.E25.2 (striking, long implement): "Strikes a ball off a tee or cone with a bat, using correct grip and side orientation/proper body orientation."
- S4.E4.2: "Works independently with others in partner environments."
- S4.E5.2: "Recognizes the role of rules and etiquette in teacher-designed physical activities."
- S4.E6.2b: "Works safely with physical education equipment."
- Passing and receiving with the feet (S1.E19) first appears in grade 3 in this document, so this unit does not teach it.
- The grade 2 year plan (health and PE, term 2).

Known gaps

- Two other agents (Gemini 4 Carbon and Gemini 4 Argon, both at 26bc764) text-checked this unit on 2026-11-11 and reported no errors. Those are text checks by AI agents, not a teacher review or classroom test.
- SHAPE America's outcomes are one US framework; other countries use other guidance. The unit quotes the outcomes but is not a full alignment.

- The "good hit" points (watch it, flat surface, firm wrist), the bat grip description and the side-on picture are my own simple teaching points, not the "critical elements" of a mature pattern, which the outcomes document does not list.
- The year plan says "passing to a partner and in small teams". Here that is done by hitting a balloon or soft ball, not by passing with the feet, because SHAPE places foot passing in grade 3.
- Hitting a ball over a low net or against a wall is a grade 3 outcome in the source and is not taught here.
- The "fair ways" for disagreements and the game-trouble stories are my own examples, not from a source, and are told with made-up characters so no child's real argument is discussed.
- Pacing is untested; classes new to paddles may need two sessions for lesson 2, and lesson 4 needs extra adults if there are more than two tees.
- The order of lessons, the games, the equipment list and the timings are my choice, not taken from a source.

Lesson 1: Balloon keep-up

Unit overview - Next: Lesson 2

Goal: Children hit a balloon upward with an open, flat hand several times in a row in their own space, and try first gentle passes to a partner.

Length: about 30 minutes.

Materials

- The cleared space, edge cones, and floor spots or hoops at least 3 metres apart, one per child.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- Latex-free balloons blown up and tied by an adult, one per child plus spares, and a lidded box for burst pieces.
- A few light beach balls or very light foam balls as a slower option.
- The "good hit" picture card (eyes on the object, flat hand or paddle, firm wrist).
- For blind or low-vision children: a sighted guide partner and a sound balloon (bell or dried beans inside, added by an adult).
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge. Show a balloon. "This term we are going to be hitters: with our hands, with paddles and with bats. Today the balloon helps us, because it is slow." Agree the stop signal: hold your balloon, freeze. Tell the class a balloon may go "bang"; ear defenders are there for anyone who wants them. If a balloon bursts, leave the pieces and tell an adult. "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1, using the six cards: march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently. Add "wrist wiggles" and "starfish hands" (fingers spread wide, then a flat hand) at the end.

✎ Main activity (15 min)

1. **Find your spot (2 min).** Each child stands on their spot or in their hoop. Arms out wide and turn slowly: "If you can touch anyone, move."
2. **Flat hand (3 min).** Show the "good hit" card. Children hold the balloon in one hand and tap it up gently with the flat palm of the other hand, then catch it. Say: "Eyes on the balloon. Flat hand. Push up." Try both hands.

3. **Hits in a row (5 min).** Now tap, tap, tap without catching. Children count their own hits in a row quietly. When the balloon lands, pick it up and start again. "Can you beat your own best?" Numbers are not said out loud or written down. Stop signal after about two minutes; then try a new challenge: hit with the other hand, hit low (below your head), or hit high.
4. **First passes (5 min).** Pairs stand on two spots about 2 metres apart with one balloon. Partner A taps it gently up and towards B; B catches it, then taps it back. When pairs are ready, B taps it back without catching. "A good pass is gentle and goes up, so your partner has time."

Children who want a slower or quieter option use a beach ball, a very light foam ball or catch between every hit.

✓ Discussion questions (4 min)

1. "Where do your eyes go when you hit?" (On the balloon, all the time.)
2. "Why does a flat hand work better than a fist?" (A flat hand is bigger, so it is easier to hit the balloon, and it sends it straight up.)
3. "What makes a pass easy to hit back?" (Gentle, goes up, goes to your partner, not too fast.)

✓ Closing check (3 min)

The teacher says three sentences; children show thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "We keep our eyes on the balloon when we hit." (True.)
2. "A good pass is as hard as we can hit." (False: gentle so your partner has time.)
3. "If a balloon bursts, we pick up the pieces." (False: leave them and tell an adult.)

Vocabulary

hit, tap, flat hand, palm, upward, in a row, pass, partner, gentle

Differentiation

- **More support:** catch between every hit; use two hands together; a partner holds the balloon on a short string while the child hits it.
- **More challenge:** hit with the back of the hand, alternate hands, or clap once between hits.
- **Moving in your own way:** children who use a wheelchair hit the balloon from their chair; partners pass to reach them. Blind or low-vision children use a sound balloon with a guide who calls "now".

⚠ Safety

- Spots at least 3 metres apart; arms-out check before starting.
- Latex-free balloons only, blown up by an adult. Burst pieces go straight into the lidded box; children do not pick them up or put them near their mouths.

- On the stop signal children hold their balloon and freeze.
- Counts are private and never recorded.

Teacher notes and misconceptions

- Many children slap down at the balloon or hit it too hard; it then flies sideways. "Push up, like lifting a tray" helps.
- Children chase balloons into other spots. Remind them: if the balloon leaves your space, wait for it to land, then walk to get it.
- Some children find it hard to track a moving object. A bigger, brightly coloured balloon and hitting low make it easier.

Lesson 2: Paddle and balloon

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children hit a balloon, and then a soft ball, upward with a short paddle several times in a row, keeping the paddle face flat and the wrist firm, and pass a balloon to a partner with paddles.

Length: about 30 minutes.

Materials

- The cleared space, edge cones, and floor spots or hoops at least 3 metres apart, one per child.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- Short-handled light paddles, one per child (foam paddles, or paper plates with a wide wooden craft stick taped firmly to the back), checked for loose tape or splinters before the lesson. A few paddles with a hand strap.
- Latex-free balloons blown up and tied by an adult, one per child plus spares, and a lidded box for burst pieces.
- A few light beach balls or very light foam balls as a slower option.
- Soft foam balls about tennis-ball size, one per pair.
- The "good hit" picture card.
- For blind or low-vision children: a sighted guide partner, a sound balloon and a raised-line copy of the "good hit" card.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge. Show a paddle. "A paddle is like a big flat hand." Show the paddle rules: carry it pointing down when you walk; swing it only on your own spot; on the stop signal, put it on the floor and freeze. "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1, using the six cards, then wrist wiggles and "starfish hands".

✎ Main activity (15 min)

1. **Flat face, firm wrist (3 min).** On their spots, children hold the paddle out flat like a tray and balance a balloon on it. Then they walk the paddle slowly in a circle without the balloon falling off. "Keep the face flat. Keep your wrist firm, not floppy."
2. **Paddle taps (5 min).** Tap the balloon up with the paddle and catch it; then tap, tap, tap without catching. Children count their own hits in a row quietly and try to beat their

own best (never said out loud or written down). Show the "good hit" card again: eyes on the balloon, flat paddle, firm wrist.
3. **Soft-ball try (3 min, optional).** Children who are ready swap the balloon for a soft foam ball: drop it on the paddle, let it bounce once off the paddle, then try two small bounces in a row. Others stay with the balloon.
4. **Paddle passes (4 min).** Pairs on two spots about 2 metres apart with one balloon. A taps it up and towards B with the paddle; B taps it back. "Gentle and up, so your partner has time."

✓ Discussion questions (4 min)

1. "What happened when the paddle face was tipped?" (The balloon or ball went sideways, not up.)
2. "Why do we keep our wrist firm?" (So the paddle stays flat and the hit goes where we want.)
3. "Why do we carry the paddle pointing down?" (So it doesn't hit anyone as we walk.)

✓ Closing check (3 min)

Thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "A flat paddle face sends the balloon straight up." (True.)
2. "We swing our paddle while we walk to our spot." (False: carry it pointing down; swing it only on your own spot.)
3. "On the stop signal, we put the paddle on the floor and freeze." (True.)

Vocabulary

paddle, face, handle, flat, firm wrist, bounce, in a row

Differentiation

- **More support:** hold the paddle with two hands; catch between every hit; use a beach ball, which is slower; use a paddle with a hand strap.
- **More challenge:** hit low, then high; turn the paddle over and use the other side between hits; move from the balloon to the soft ball.
- **Moving in your own way:** a child in a wheelchair can use a longer-handled light paddle; a partner can hold a balloon on a short string for a child who finds tracking hard. Blind or low-vision children use a sound balloon with a guide who calls "now".

⚠ Safety

- Check paddles before the lesson; remove any with loose tape or splinters.
- Paddles carried pointing down; swung only on your own spot, below the head height of anyone nearby.
- Latex-free balloons; burst pieces into the lidded box.

- Counts are private and never recorded.

Teacher notes and misconceptions

- Children often swing the paddle like a racket and hit sideways. "Lift the tray" works better at this age than "swing".
- A floppy wrist sends the balloon backwards over the child's head. Ask them to "freeze the wrist" and lift from the shoulder.
- The soft ball is much faster than a balloon. Some children will not be ready this lesson; that is fine.

Lesson 3: Team keep-up and fair play

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children keep a balloon up together in a small team, calling "mine" and taking turns, and talk about fair ways to sort out a disagreement in a game, using made-up characters.

Length: about 30 minutes.

Materials

- The cleared space and edge cones. Floor spots set out as team circles: four spots about 2 metres apart in a square, with each team square at least 4 metres from the next.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- Latex-free balloons blown up and tied by an adult (one per team plus spares), and a lidded box for burst pieces.
- A few light beach balls as a slower option.
- Short-handled light paddles, one per child (optional in this lesson).
- Four "game trouble" picture cards with made-up characters from Little Hill:
- A: Goat and Hen both run for the balloon and bump into each other.
- B: Mouse says the balloon touched the floor. Duck says it didn't.
- C: Remy hits the balloon every time. Bear never gets a turn.
- D: Duck gets cross and kicks the balloon away.
- The "fair ways" card: stop; say what you saw; listen; choose: do it again, take turns, or ask the referee.
- For blind or low-vision children: a sighted guide partner and a sound balloon; the game-trouble stories are read aloud.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge. "Today we hit together as a team of four. Teams need two rules: call 'mine' before you hit, and nobody hits twice in a row." Show how to call "mine" (or raise a hand, or sign it). "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1, using the six cards, then wrist wiggles.

✎ Main activity (15 min)

1. **Team keep-up (7 min).** Teams of four stand on their square of spots. One child taps the balloon up and calls "mine"; anyone else calls "mine" and hits it next. Nobody hits

twice in a row. Teams count their hits in a row quietly and try to beat their own team best (not compared between teams). Children may use hands or paddles. Stop signal after about three minutes; then try a new challenge: everyone must hit once before anyone hits again.

2. **Game trouble (8 min).** Children sit by their team. Show card A and tell the story: "Goat and Hen both ran for the balloon, and bump! What could they do?" Take ideas, then point to the "fair ways" card. Do the same with cards B, C and D. Possible answers:
3. A: Call "mine"; the one who called first hits; check they are both all right.
4. B: Stop; each says what they saw; if they still don't agree, do it again, or ask the referee.
5. C: Use the rule: nobody hits twice in a row; Bear can call "mine".
6. D: Duck stops and uses a calm-down from grade 1 (slow breaths, count to five), then says "I feel cross because..."; the team carries on.

The stories are always about the made-up characters. Children are not asked to share a real argument they have had.

✓ Discussion questions (4 min)

1. "Why do we call 'mine'?" (So two people don't run for the same balloon and bump.)
2. "What is one fair way to sort out 'it touched the floor' / 'it didn't'?" (Do it again, or ask the referee.)
3. "How did the 'nobody twice in a row' rule help Bear?" (Everyone gets a turn.)

✓ Closing check (3 min)

Each child shows (points to the card, says or signs) one fair way from the "fair ways" card to sort out a disagreement in a game. The teacher notes it on the class list. Accept: stop, say what you saw, listen, do it again, take turns, ask the referee.

Vocabulary

team, mine, turn, rule, fair, disagree, referee

Differentiation

- **More support:** teams of three; catch-then-hit allowed; a beach ball instead of a balloon; an adult joins a team.
- **More challenge:** hands only, or paddles only; one bounce on the floor allowed and then keep going.
- **Moving in your own way:** a child in a wheelchair has a spot in the team square where the others pass to reach them. Blind or low-vision children use a sound balloon; team-mates call "mine" clearly so they know where the balloon is going. Deaf children see "mine" as a raised hand or sign.

⚠ Safety

- Team squares at least 4 metres apart; children stay on or near their own spot.
- "Mine" calls stop collisions; children do not dive for the balloon.
- Paddles below head height of team-mates.
- Latex-free balloons; burst pieces into the lidded box.

Teacher notes and misconceptions

- Children often think "fair" means "I win". The stories help them see the other side without blaming anyone in the class.
- Some children will want to tell a real story ("my brother..."). Thank them and bring it back to the made-up characters.
- The "fair ways" are examples, not from a source; schools may have their own conflict steps to use instead.

Lesson 4: Batting off a tee

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children hit a soft ball off a tee or tall cone with a light bat, holding the bat with both hands together and standing side-on to the tee, and follow the batting-box rules.

Length: about 30 minutes.

Materials

- The cleared space and edge cones. Two to four batting stations (one per adult helper), set out side by side at least 8 metres apart, all hitting in the same direction into an empty area with no people, windows or lights.
- At each station: a batting tee or tall cone; a light foam or plastic bat with a wide barrel; six large soft foam balls (about grapefruit size); a collecting bucket; floor tape or chalk for a batting box beside the tee, a safety circle about 2 metres across around the batting box, and a waiting line at least 4 metres behind the safety circle.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The green "collect" card.
- The six grade 1 warm-up cards.
- The "bat grip" and "side-on" picture cards and the "hitting space" rules card.
- Rolled-up newspaper "bats" or pool-noodle pieces, one per child, for practice swings without a ball.
- For blind or low-vision children: a sighted guide partner, a bell ball or larger bright foam ball, and a raised-line copy of the "bat grip" card.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge, facing a batting station. Show the "hitting space" rules card and walk through the station: only the batter goes inside the safety circle; everyone else waits behind the waiting line; after the hit, the bat is put down in the box; balls are collected only when the adult shows the green card and every bat is on the floor. "Why?" (A swinging bat can hurt someone standing close.) "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1, using the six cards, then slow "trunk twists" with arms out (turning the shoulders gently from side to side).

✎ Main activity (15 min)

1. **Grip and stance without a ball (4 min).** Each child on their own spot with a newspaper bat or noodle piece. Show the "bat grip" card: hands together, one above the other, knuckles lined up. Show the "side-on" card: stand sideways to the target, front shoulder pointing where the ball should go, feet apart. Children try both ways round and choose the one that feels better (that tells you if they bat right- or left-handed). Slow practice swings: "Look at the spot. Swing level, like sweeping a table."
2. **Batting stations (11 min).** Groups of about six to eight at each station with an adult. One child at a time: walk into the box, pick up the bat, take the grip, stand side-on, look at the ball, swing and hit it off the tee, then put the bat down in the box and walk back to the end of the waiting line. Each child has about three hits per turn. When all six balls are out, the adult checks that the bat is down and shows the green card; two children collect balls into the bucket and walk back. Groups keep turning until the stop signal.

Children who choose not to bat can be ball collectors (on the green card only) or the "tee setter" who places the ball, with the bat on the floor.

✓ Discussion questions (4 min)

1. "Where do your hands go on the bat?" (Together, one above the other.)
2. "Which way do you stand to the tee?" (Side-on, shoulder pointing at the target.)
3. "When can we collect the balls?" (Only when the adult shows the green card and every bat is on the floor.)

✓ Closing check (3 min)

Thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "We wait behind the waiting line while someone bats." (True.)
2. "After the hit, we throw the bat so we can run." (False: put it down in the box.)
3. "We look at the ball when we swing." (True.)

Vocabulary

bat, tee, grip, side-on, swing, level, batting box, safety circle, waiting line, collect

Differentiation

- **More support:** a bigger ball or a balloon taped lightly on the tee; a shorter, lighter bat; an adult says "ready, look, swing" for each hit.
- **More challenge:** aim at a big target cone placed far out in the empty area; lower the tee.
- **Moving in your own way:** a child in a wheelchair bats from their chair with the tee set at chair height and the chair side-on to the tee; a child who cannot grip a bat can use a light paddle with a hand strap. Blind or low-vision children use a bell ball; a guide places their hand on the ball, then the child steps back and swings. Deaf children see the green card and the stop signal.

⚠ Safety

- Only the batter inside the safety circle. Waiting line at least 4 metres behind it. A child who bats left-handed stands on the other side of the tee; the safety circle and waiting line work for both sides.
- Bats are put down in the box after every turn, never thrown, and never carried while walking to collect balls.
- Balls collected only on the green card, with every bat on the floor.
- Stations far apart and all hitting the same way into an empty area.
- Light foam or plastic bats and soft foam balls only.

Teacher notes and misconceptions

- Many children stand facing the tee and chop down. The side-on card and "sweep the table" help.
- Some children let go of the bat after the hit. Practise "hit, hold, put it down" with the newspaper bats first.
- A child who switches between right- and left-handed is not doing it wrong; let them choose and check where they stand.

Lesson 5: Hitting stations

Unit overview - Previous: Lesson 4

Goal: Children help make the rules for three hitting stations, play at each station safely and fairly, and show what they can do in a one-to-one check.

Length: about 30 minutes, plus extra check slots in the week.

Materials

- The cleared space and edge cones, set out as three stations far apart:
- **Team keep-up:** team squares of four floor spots about 2 metres apart, each square at least 4 metres from the next; latex-free balloons (one per team plus spares).
- **Paddle keep-up:** floor spots or hoops at least 3 metres apart; short-handled light paddles (one per child, a few with a hand strap); latex-free balloons and soft foam balls about tennis-ball size.
- **Tee batting** (only with an adult helper at the station): a batting tee or tall cone; a light foam or plastic bat; six large soft foam balls; a collecting bucket; a batting box, safety circle and waiting line marked with tape or chalk, hitting into an empty area; the green "collect" card.
- Three station signs with pictures (team keep-up, paddle keep-up, tee batting).
- A lidded box for burst balloon pieces.
- A few light beach balls as a slower option.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- The "good hit", "bat grip", "side-on" and "hitting space" cards, and the "fair ways" card from lesson 3.
- A large blank card and a thick pen for the class's station rules.
- A check spot at the edge with one balloon, one paddle, and a newspaper bat or noodle piece, and a copy of the one-to-one check below.
- For blind or low-vision children: a sighted guide partner, a sound balloon and a bell ball.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge. "Today you help make the rules." Ask: "What rule keeps us safe at the batting station? What rule keeps the team keep-up fair?" Write three or four of the children's rules on the big card in their words (for example: "Stay on your spot", "Call 'mine'", "Put the bat down", "Nobody twice in a row"). Read them back together. Show the "fair ways" card: "If something goes wrong, which of these can we use?"

Warm-up (5 min)

The class warm-up from grade 1, using the six cards; a child leads one move of their choice.

✎ Main activity (15 min)

Three groups rotate around the three stations, about 5 minutes each, moving on the stop signal (walking, paddles pointing down, bats left in the box). Children may choose a balloon, a beach ball or a soft ball at the keep-up stations. Hit counts stay private.

If there is only one adult, leave out the batting station: use two keep-up stations and do part 4 of the check with the newspaper bat.

While the stations run, the teacher calls children one at a time to the check spot (see below). Children who are not being checked keep playing.

✓ Discussion questions (4 min)

1. "Which of our rules did you use today?" (Any rule from the class card.)
2. "Did anything go wrong at a station? Which fair way helped?" (Answers are about what happened at the stations; nobody is named or blamed.)
3. "What is one thing you can do now that was hard in lesson 1?" (Any answer; for example more hits in a row, a flat paddle, hitting off the tee.)

✓ Closing check (3 min)

Each child points to (or says or signs) one class rule and tells why it helps. The teacher notes any child who has not yet done the one-to-one check.

One-to-one check (about 3 minutes per child)

Done at the check spot. Each part is marked yes / with help / not yet on the class list. The number of hits is not recorded.

1. **Open-hand hits:** "Keep the balloon up with your hand." Yes: three or more hits in a row upward, eyes on the balloon. With help: hits with a catch between. Not yet: cannot make contact yet.
2. **Paddle hits:** "Now with the paddle." Yes: three or more hits in a row upward with a flat paddle face. With help: a catch between hits, or two hands on the paddle. Not yet: the balloon goes sideways most times.
3. **Pass:** the teacher stands about 2 metres away. "Pass the balloon to me so I can hit it back." Yes: a gentle upward hit that reaches the teacher. With help: reaches after a second try or a step closer. Not yet: goes hard or away from the teacher.
4. **Grip and stance:** with the newspaper bat (or at the tee). "Show me how you hold the bat and stand to hit." Yes: hands together, one above the other, standing side-on. With help: one of the two. Not yet: neither.
5. **Rules and fair play:** "Tell me one rule at the batting station and one fair way to sort out a disagreement." Yes: one safe batting rule (wait behind the line, put the bat down, collect on

the green card, only the batter in the circle) and one fair way (stop, say what you saw, listen, do it again, take turns, ask the referee). With help: one of the two. Not yet: neither.

Children answer in their own way: saying, signing, pointing to a card or showing. A child using a wheelchair, strap paddle or sound balloon is checked with that equipment.

Vocabulary

station, rule, rotate, fair, safe, check

Differentiation

- **More support:** stay at a keep-up station with a beach ball; an adult or a chosen partner goes round the stations with the child.
- **More challenge:** at keep-up, alternate hand and paddle; at the tee, aim at a target cone.
- **Moving in your own way:** stations are set so children in wheelchairs can reach every spot and the tee at chair height; blind or low-vision children use sound balloons and bell balls with a guide; deaf children see the station signs and the stop signal.

⚠ Safety

- Stations far apart; the batting station hits away from the other two.
- Batting only with an adult at the station; one batter at a time; bats put down; balls collected only on the green card.
- Paddles pointing down while moving between stations.
- Latex-free balloons; burst pieces into the lidded box.

Teacher notes

- Children's own rules are usually close to the adult rules and are more likely to be followed. If a safety rule is missing (for example the green card), add it and say why.
- If a disagreement happens, use the "fair ways" card rather than deciding for the children straight away.
- Finish any checks in the week; it is fine to check a child over two short visits.

Grade 2 Health and PE: Healthy Habits and a Class Game Day (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 11 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check space, equipment, sun, heat, water, hygiene and medical notes against your school's rules and health guidance.
>
> Text-checked by three other agents (Gemini 3.8 Flash, Gemini 4 Carbon and Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 3. Builds on grade 2 terms 1 and 2 Balance, rolling and jumping and Hitting and passing (the game-day stations reuse those skills) and grade 1 Fair games, teeth, medicines and help (fair play and asking an adult for help)

Big idea

Moving makes our hearts beat faster and our breathing quicker, and using our own body weight, as in animal walks, makes muscles stronger. A healthy day has a balance of playing, resting, drinking water and eating. On a hot or sunny day we drink water, find shade, cover up as the school says, and tell an adult if we feel unwell. Washing hands well, including the thumbs, wrists, between the fingers and under the nails, helps stop germs spreading. A class game day is more fun and fairer when everyone has helped make the rules.

This is the third health and PE unit of the grade 2 year (term 3). In term 1 children balanced, rolled and jumped on mats; in term 2 they hit and passed balloons and soft balls. This unit adds healthy habits and ends with a class game day that uses skills from the whole year.

Outcomes

By the end of the unit a student can:

1. Move like two animals using their own body weight (for example a bear walk and a crab walk, or a seated or wall version), and name one activity that helps make the body stronger or fitter.
2. Say two ways to keep well on a hot or sunny day (drink water, rest in the shade, wear a hat or cover up as the school says) and one sign that means "stop and tell an adult" (feeling dizzy, a headache, feeling sick or very tired).
3. Show the hand-washing steps (wet, soap, palms, backs, between the fingers, thumbs, under the nails, rinse, dry) and say one time to wash hands (after the toilet, before eating, after playing outside).
4. Say how playing, resting, drinking water and eating fit together in a healthy day (a "good health balance").
5. Help make a class rule for game day, say why it matters, and follow the class rules at the game-day stations.

Prior knowledge

- From kindergarten and grade 1: "my bubble" space, the stop signal, the class warm-up, hand-washing with soap and water, taking turns, fair games and telling an adult when something is wrong.
- From grade 2 terms 1 and 2: working on your own spot, balancing on different body parts, hitting a balloon in a row, passing to a partner, the "fair ways" card for disagreements.
- Children come with very different home routines. This unit never asks what children eat or drink at home, when they go to bed, or what they wear or own. Habits are talked about through made-up characters from Little Hill and through what we do at school.

Lessons

PE lessons are about 30 minutes (opening 3, warm-up 5, main 15, discussion 4, closing check 3). Leave a day or two between lessons. The stop signal is used in every lesson, and the class warm-up from grade 1 starts every lesson.

Lesson	Title	Main activity
1	Strong bodies, beating hearts	Animal walks with our own body weight; noticing breathing and heartbeat after moving; resting when we need to
2	Water, shade and keeping cool	A gentle circuit with water breaks; the "keeping cool" cards; signs that mean stop and tell an adult (made-up characters)
3	Clean hands and a balanced day	Hand-washing steps with a washable-marker check; the "good health balance" wheel
4	Making our game-day rules	Trying the four game-day stations; groups suggest rules; the class agrees its rule card
5	Class game day	Stations with the class rules, water and rest breaks; one-to-one check

Materials (whole class unless noted)

- A hall or cleared indoor space with a non-slip floor, away from walls, windows and lights; or a shady, flat outdoor area if the weather and your school allow. Cones or floor spots to mark the edge.
- About 30 floor spots or hoops, one per child (every lesson).
- The stop signal, both heard and seen: a drum or tambourine plus a raised hand or a red card with a square (every lesson).
- The six grade 1 warm-up cards (march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently) (every lesson).
- A "rest card" for each child or a rest spot at the edge marked with a green cushion or mat: going there needs no reason (every lesson).
- Each child's own labelled water bottle, or cups and a jug of drinking water poured by an adult (every lesson; never shared).
- Lesson 1: four animal-walk picture cards (bear walk, crab walk, frog jump, wall push), and a seated version on each card (seated arm push-up from the chair arms or floor, seated "crab" lift of the hips if able, pressing palms together hard).
- Lesson 2: five "keeping cool" picture cards (water bottle, shade tree, hat, rest spot, adult helper); four "How is Goat feeling?" story cards (see lesson 2); four cones for a gentle circuit, each with a picture of its move (march, side-steps, gallop, balance on one foot).
- Lessons 3 and 5: sinks with soap and paper towels (or a hand-washing station with warm water, soap, a bowl and paper towels set up by an adult).

- Lesson 3: a "washing steps" picture strip (wet, soap, palms, backs, between the fingers, thumbs, under the nails, rinse, dry); one washable felt-tip pen (an adult uses it) and a few stickers; a sand timer or a slow count to 20; the "good health balance" wheel, a large card circle cut into four parts (play, rest, water, food) with a picture on each part; four "Little Hill day" picture cards (see lesson 3).
- Lessons 4 and 5 (game-day stations): balance line (floor tape or a long rope laid flat); balloon keep-up (latex-free balloons blown up and tied by an adult, a few beach balls or very light foam balls, and a lidded box for burst pieces); beanbag toss (beanbags and three hoops at different distances, with a throwing line of floor tape); animal-walk path (cones and the four lesson 1 cards). Four station signs with pictures.
- Lesson 4: a large blank "Our game-day rules" card and a thick pen; four "rule idea" picture cards (safety, taking turns, kind words, water and rest); one sticky dot per child for choosing.
- Lesson 5: the class's own "Our game-day rules" card from lesson 4; the "fair ways" card from grade 2 term 2 (stop; say what you saw; listen; choose: do it again, take turns, or ask the referee); at the check spot, the keeping cool cards, the washing-steps strip and the wheel.
- A second adult if possible (lesson 3 for small-group washing; lesson 5 to watch the stations during the checks).
- A class list for notes (every lesson).
- Ear defenders and a quiet spot at the edge for children who need them (every lesson; balloons can burst with a bang in lessons 4 and 5).
- For blind or low-vision children: a sighted guide partner (every lesson); a sound balloon (bell or dried beans inside, added by an adult) or a bell ball (lessons 4 and 5); raised-line (dried glue) copies of the washing-steps strip and of the rule card.

⚠ Safety and access

- **Heat and sun:** follow your school's sun and heat policy. On a hot day, move every lesson indoors or into full shade, shorten the circuit and add water breaks. Hats and covering up follow school rules. Children never put sun cream on each other; if sun cream is used, follow the school's policy. Never look at the Sun.
- **Water:** each child drinks from their own bottle or cup only. Water is offered at every break; no child is made to drink or praised for drinking a lot.
- **Feeling unwell:** any child who says or shows they feel dizzy, has a headache, feels sick, is very hot or very tired stops, sits in the shade or a cool place and is looked after by an adult, following the school's first-aid plan.
- **Hearts and breathing:** children may notice their own breathing or put a hand on their own chest if they want to. Nobody counts, records or compares heartbeats, breaths, weight or any body measure.
- **Animal walks:** short turns (about 20 seconds), on a non-slip floor, with lots of space. Crab and bear walks put weight on the wrists; any child with wrist, shoulder or joint pain uses the wall push or a seated version. Frog jumps land on two feet with bent knees, never onto anyone.
- **Hand-washing:** an adult uses the washable felt-tip pen only on children who agree, on the back of the hand and the thumb only (never near eyes or on broken or sore skin, and not for children with eczema or skin allergies); those children watch or use a sticker instead. Check soap allergies. Wipe up water spills at once.

- **Latex and balloons (lessons 4 and 5):** latex-free balloons only, blown up and tied by an adult. Burst pieces go straight into the lidded box; children tell an adult and do not pick them up.
- **Medical:** check records for conditions that affect exercise or heat (asthma, heart, diabetes, epilepsy, and any others) and follow each child's plan; keep inhalers to hand.
- **Opt-in:** every activity is an invitation. Children may rest at any time with the rest card and no reason. "Your own way counts" is said in every lesson.
- **Moving in your own way:** a child who uses a wheelchair or walker does seated versions of the animal moves, moves along the circuit in their chair, and plays every station from their chair (balance station: hold a balance shape in the chair or steer along the line). Blind or low-vision children use a sighted guide, a sound balloon and the raised-line cards; deaf children get every instruction shown as well as said.
- **Privacy:** no questions about home food, drinks, bedtimes, clothes or routines. Stories use made-up characters.

Assessment

- Lessons 1-4: the teacher watches for safe animal walks (or a chosen version), choosing water and rest, the hand-washing steps, and helping to make and keep rules, and notes it on a class list.
- Lesson 5: a one-to-one check with five parts and an answer guide (about 3 minutes per child), done while the class plays at the stations. Plan extra small-group or one-to-one slots in the week to finish the checks. Each part is marked yes / with help / not yet. No body measure is ever part of the mark.

Sources

- SHAPE America, "Grade-Level Outcomes for K-12 Physical Education" (2013), read 10 and 11 November 2026; grade 2 quotations checked against page images: https://www.shapeamerica.org/wp-content/uploads/Grade-Level-Outcomes-for-K-12-Physical-Education.pdf
- S3.E3.2a: "Uses own body as resistance (e.g., holds body in plank position, animal walks) for developing strength."
- S3.E3.2b: "Identifies physical activities that contribute to fitness."
- S3.E6.2 (nutrition): "Recognizes the "good health balance" of good nutrition with physical activity."
- S5.E1.2: "Recognizes the value of "good health balance.""
- S4.E2.2: "Accepts responsibility for class protocols with behavior and performance actions."
- S4.E5.2: "Recognizes the role of rules and etiquette in teacher-designed physical activities."
- S5.E2.2: "Compares physical activities that bring confidence and challenge."
- Fitness knowledge about warm-up and cool-down (S3.E4) first appears in grade 3 in this document, so the warm-up here is a routine, not a taught outcome.
- Wikipedia, "Hand washing" (read 6 November 2026): https://en.wikipedia.org/wiki/Hand_washing
- Steps: lather the backs of hands, between fingers and under nails; scrub for at least 20 seconds; rinse well under running water; dry with a clean towel or air dry.
- The most commonly missed areas are the thumb, the wrist, between the fingers and under the fingernails.
- Critical times include after using the toilet and before eating.
- Frequent hand washing can dry the skin.

- Wikipedia, "Sunburn" (read 11 November 2026): https://en.wikipedia.org/wiki/Sunburn
- "Sun protective measures like sunscreen and sun protective clothing are widely accepted to prevent sunburn and some types of skin cancer." It adds that children are especially susceptible to sunburn.
- Wikipedia, "Heat illness" (read 11 November 2026): https://en.wikipedia.org/wiki/Heat_illness
- Prevention includes gradual adjustment to heat and sufficient fluids; very young children are at higher risk of heat-related illness; symptoms of heat exhaustion may include headache, nausea, dizziness and feeling unwell, and treatment includes removing the person from the heat and replenishing fluids.
- KidsHealth (Nemours), "What's a Healthy Alternative to Water?" (read 11 November 2026; the page served is the version for teens): https://kidshealth.org/en/kids/water.html
- "Water is always the best way to hydrate and avoid empty calories."
- The grade 2 year plan (health and PE, term 3).

Known gaps and cautions

- SHAPE America's outcomes are physical education outcomes. No health education standard was read for this unit; the water, sun, heat and hand-washing content rests on the general sources above and needs a check against your school's health guidance.
- The quoted SHAPE outcomes are one US framework; the unit quotes them but is not a full alignment.
- The year plan assumes children can go outside and that summer sun is a concern. Schools in other climates, or in a cold or rainy term, should keep the lessons indoors and swap the sun examples for their own weather.
- The four-part "good health balance" wheel (play, rest, water, food), the "keeping cool" cards, the signs to tell an adult as worded here and the stories are my own simplifications, not taken from a source. The wheel does not sort foods into good and bad.
- Sleep is mentioned only through a made-up character; the unit does not teach how many hours to sleep and never asks about children's bedtimes.
- Grade 2 social-interaction outcomes (S5.E4) first appear in grade 3 in the source; the rule-making in lessons 4 and 5 follows S4.E2.2 and S4.E5.2 instead.
- Pacing is untested. Hand-washing at sinks in lesson 3 takes longer with few sinks; split the class or wash in groups across the day.
- The order of lessons, the games, the stations, the equipment list and the timings are my choice, not taken from a source.
- Three other agents (Gemini 3.8 Flash, Gemini 4 Carbon and Gemini 4 Argon, all at 120023f) text-checked this unit on 2026-11-11 and reported no errors in the unit files. Argon also reported a missing note in the grade 2 year plan, fixed separately. Those are text checks by AI agents, not a teacher review or classroom test.

Lesson 1: Strong bodies, beating hearts

Unit overview - Next: Lesson 2

Goal: Children use their own body weight in animal walks to help make muscles stronger, notice that moving makes breathing quicker and the heart beat faster, and choose to rest when they need to.

Length: about 30 minutes.

Materials

- The cleared space, edge cones, and floor spots or hoops, one per child.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- The rest spot at the edge (green cushion or mat) or a rest card for each child.
- Four animal-walk picture cards (bear walk, crab walk, frog jump, wall push), each with a seated version.
- Each child's own labelled water bottle, or cups and a jug of drinking water poured by an adult.
- For blind or low-vision children: a sighted guide partner.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge. "This term is about keeping our bodies well: moving, resting, water, clean hands. At the end we will have a class game day, and you will help make the rules." Show the rest spot: "If you need a rest, go there. You don't need to tell anyone why." Agree the stop signal: freeze where you are. "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1, using the six cards: march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently.

✎ Main activity (15 min)

1. **Quiet bodies (2 min).** Children sit on their spots. "Put a hand on your chest or tummy if you want to. Is your breathing slow or quick?" Nothing is counted.
2. **Animal walks (8 min).** Show one card at a time and model it. Each turn is about 20 seconds, then the stop signal and a short rest.
3. **Bear walk:** hands and feet on the floor, bottom up, walk slowly forwards.
4. **Crab walk:** sit, hands behind, lift the bottom a little, walk slowly backwards or sideways. (Look over your shoulder first.)

5. **Frog jump:** squat, hands on the floor between the feet, jump a small way forward and land on two feet with bent knees.
6. **Wall push:** stand facing a wall, hands flat on it at shoulder height, bend the arms and push away, slowly, five times. "When you move your own body like this, your muscles work hard and get stronger." Seated versions are always on the card: push up on the chair arms or hands on the floor, lift the hips a little, press palms together hard and count to five.
7. **Notice again (2 min).** Sit on the spot. "Hand on your chest or tummy if you want to. Is your breathing slower or quicker than before? Is your heart beating harder?" Children may say, sign or show with a hand moving fast or slow.
8. **Water and rest (3 min).** Everyone has a drink from their own bottle or cup. "When we move a lot, our bodies need rest and water. Rest is part of playing well, not giving up."

✓ Discussion questions (4 min)

1. "What happened to your breathing after the animal walks?" (It got quicker; our heart beat faster.)
2. "Which animal walks made your arms or legs work hard?" (Any honest answer, for example bear walk for arms, frog jump for legs.)
3. "Can you name another activity that helps make your body stronger or fitter?" (For example climbing, swimming, running games, dancing, cycling, skipping; any active play.)

✓ Closing check (3 min)

The teacher says three sentences; children show thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "When we move fast, our heart beats faster and we breathe quicker." (True.)
2. "Animal walks use our own body to make muscles work." (True.)
3. "If we need a rest, we have to tell everyone why." (False: we go to the rest spot, no reason needed.)

Vocabulary

muscles, strong, heart, breathing, quicker, slower, rest, body weight

Differentiation

- **More support:** shorter turns; do the wall push instead of bear or crab walk; a partner walks beside.
- **More challenge:** bear walk sideways, or hold a still bear shape for a count of five (a "plank" on hands and feet).
- **Moving in your own way:** children who use a wheelchair do the seated versions; blind or low-vision children move with a sighted guide calling the direction; deaf children follow the cards and the teacher's model.

⚠ Safety

- Lots of space between children; walks go in the same direction, slowly.
- Crab and bear walks load the wrists: children with wrist, shoulder or joint pain use the wall push or a seated version.
- Frog jumps are small and land on two feet, never onto anyone.
- Nobody counts, records or compares heartbeats or breaths.
- Water from each child's own bottle or cup only.

Teacher notes and misconceptions

- Some children think being out of breath means something is wrong. Quicker breathing after moving is usual; say so. If a child seems very unwell, stop and follow the school's first-aid plan.
- Some children think resting means they "lost". Praise choosing rest.
- Do not ask children which sports they do outside school; let them offer ideas for the discussion if they want to.

Lesson 2: Water, shade and keeping cool

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children say ways to keep well on a hot or sunny day (water, shade, a hat or covering up, rest) and the signs that mean "stop and tell an adult", and practise taking water and rest breaks during a gentle circuit.

Length: about 30 minutes.

Materials

- The cleared space (indoors, or a shady outdoor area if the weather and your school allow), edge cones, and floor spots or hoops, one per child.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- The rest spot at the edge (green cushion or mat) or a rest card for each child.
- Five "keeping cool" picture cards: water bottle, shade tree, hat, rest spot, adult helper.
- Four "How is Goat feeling?" story cards (below).
- Four cones for the circuit, each with a picture of its move (march, side-steps, gallop, balance on one foot).
- Each child's own labelled water bottle, or cups and a jug of drinking water poured by an adult.
- For blind or low-vision children: a sighted guide partner.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge. "Last time our hearts beat faster and we needed rest and water. Today: how do we keep well when it is hot or sunny?" Remind the class of the rest spot and the stop signal. "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1, using the six cards: march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently.

✎ Main activity (15 min)

1. **Keeping cool cards (3 min).** Show the five cards one at a time. Children say or sign what each one is and how it helps: water (our bodies need it, more when we move or it is hot), shade (out of the hot sun), hat or covering up (as the school says), rest (slow down when hot or tired), adult helper (tell them if you feel unwell).
2. **Gentle circuit with breaks (7 min).** Four cones in a big circle, each with a move: march, side-steps, gallop, balance on one foot (or hold a still shape) for a slow count of

five. Children move round in the same direction. After about two minutes, give the stop signal: "Water and shade break." Everyone drinks from their own bottle or cup and sits in the shade or at the edge for about a minute. Repeat once more. Anyone may go to the rest spot at any time.

3. **How is Goat feeling? (5 min).** Goat is visiting Little Hill from Snowy Peak, where it is cold. Show the cards one at a time; children decide what Goat should do.
4. **Card 1:** It is a hot, sunny day. Goat runs and runs in the middle of the field. Goat has no hat and left its water bottle in the classroom. (Get the water bottle, play in the shade, wear a hat as the school says, take rests.)
5. **Card 2:** Goat stops. Goat feels dizzy and has a headache. (Stop, sit somewhere cool or in the shade, tell an adult straight away.)
6. **Card 3:** Duck is playing too. Duck has a drink from its own bottle and sits under a tree for a rest, then plays again. (Duck is keeping cool; resting is part of playing.)
7. **Card 4:** Goat wants to share a drink from Duck's bottle. (Each person drinks from their own bottle or cup; ask an adult for a cup.) Goat thanks everyone: "Next time I will bring my water, rest in the shade, and tell an adult if I feel funny."

✓ Discussion questions (4 min)

1. "Why do we need more water when we move a lot or it is hot?" (Our bodies get hot and sweaty and lose water; drinking helps us keep well.)
2. "What are some signs that mean stop and tell an adult?" (Feeling dizzy, a headache, feeling sick, feeling very hot or very tired.)
3. "Why do we each drink from our own bottle or cup?" (So we do not pass germs to each other.)

✓ Closing check (3 min)

The teacher says three sentences; children show thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "On a hot day, playing in the shade can help us keep cool." (True.)
2. "If we feel dizzy, we keep running and don't tell anyone." (False: stop, sit somewhere cool and tell an adult.)
3. "It is fine to share a friend's water bottle." (False: each person uses their own bottle or cup.)

Vocabulary

hot, cool, shade, water, thirsty, dizzy, headache, rest, sun

Differentiation

- **More support:** walk the circuit instead of galloping; hold a wall or partner at the balance cone; point to the keeping cool cards instead of saying them.
- **More challenge:** in the discussion, think of a way to keep cool that is not on the cards (for example a cool, wet cloth on the neck given by an adult, or a fan).

- **Moving in your own way:** children who use a wheelchair move round the circuit in their chair and do a seated balance shape at the balance cone; blind or low-vision children use a sighted guide; deaf children use the cone pictures and the seen stop signal.

⚠ Safety

- Follow your school's sun and heat policy. On a hot day, stay indoors or in full shade, shorten the circuit and add more water breaks.
- Never look at the Sun.
- No child is made to drink or praised for drinking more than others.
- Any child who seems unwell stops at once and is looked after by an adult, following the school's first-aid plan.
- Children never put sun cream on each other.

Teacher notes and misconceptions

- Some children think "keeping cool" means only on summer holidays. Moving hard indoors makes us hot too.
- Some children think a hat is enough on its own. Water, shade and rest matter as well.
- The card stories use Goat so that no child is asked about their own family's habits, clothes or drinks.
- In a cold or rainy term, keep the lesson indoors and talk about how moving makes us hot even on a cold day; keep the water breaks.

Lesson 3: Clean hands and a balanced day

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children show the hand-washing steps, find the places that are often missed, say when to wash hands, and say how playing, resting, water and food fit together in a healthy day.

Length: about 30 minutes.

Materials

- The cleared space or the classroom, near sinks.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- The rest spot at the edge (green cushion or mat) or a rest card for each child.
- Sinks with soap and paper towels, or a hand-washing station with warm water, soap, a bowl and paper towels set up by an adult.
- The "washing steps" picture strip: wet, soap, palms, backs, between the fingers, thumbs, under the nails, rinse, dry.
- One washable felt-tip pen (an adult uses it) and a few stickers.
- A sand timer, or a slow count to 20.
- The "good health balance" wheel: a large card circle cut into four parts (play, rest, water, food), with a picture on each part.
- Four "Little Hill day" picture cards (below).
- Each child's own labelled water bottle, or cups and a jug of drinking water poured by an adult.
- For blind or low-vision children: a sighted guide partner and a raised-line (dried glue) copy of the washing-steps strip.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.
- A second adult if possible (for small-group washing at the sinks).

Steps

✎ Opening (3 min)

Sitting together. "Germs are too small to see. Washing our hands with soap and water helps stop them spreading. Today we will find the places that are easy to miss." Remind the class of the stop signal and the rest spot. "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1, using the six cards: march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently. Finish with "air washing": everyone does the washing steps in the air with no water.

✎ Main activity (15 min)

1. **The washing steps (3 min).** Show the strip. Everyone does each step "in the air" with the teacher: wet, soap, rub palms, rub the backs, fingers between fingers, hold each thumb and twist, scratch the nails on the other palm, rinse, dry. "We rub for about 20 seconds: a slow count to 20, or until the sand runs out."
2. **The marker check (7 min).** Ask for volunteers. With each child's agreement, an adult draws a small dot with the washable felt-tip on the back of their hand and one on their thumb. (Children who do not want a dot, or who have eczema, sore skin or a skin allergy, wear a sticker in the same place instead and peel it off at the end, or watch.) In small groups at the sinks, children wash using the steps and the slow count. Then they look: has the dot gone? "The thumb and between the fingers are the places people miss most." If there are few sinks, one group washes with the second adult while the others start part 3, and the rest wash later in the day.
3. **A balanced day (5 min).** Show the four Little Hill day cards and the wheel. Children place each card on the right part of the wheel.
4. Mouse plays chase in the park with friends. (Play.)
5. Bear has a drink of water from its own bottle after playing. (Water.)
6. Duck eats lunch at the picnic table, after washing its wings. (Food.)
7. Goat goes to bed early the night before the big game day, so it feels rested. (Rest.) "If Mouse played all day and never rested, never had a drink and never ate, how might Mouse feel?" (Tired, thirsty, hungry, maybe unwell.) "A healthy day has some of every part. That's a good health balance."

✓ Discussion questions (4 min)

1. "Which places on our hands are easy to miss?" (The thumbs, between the fingers, the wrists and under the nails.)
2. "When should we wash our hands?" (After the toilet, before eating, after playing outside, after blowing our nose.)
3. "Why does a healthy day need play and rest and water and food?" (Play makes us strong, food gives us energy to play, water and rest help our bodies recover; we need all of them.)

✓ Closing check (3 min)

The teacher says three sentences; children show thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "We wash our hands before we eat." (True.)
2. "A quick splash of water with no soap is enough." (False: soap, rub for about 20 seconds, rinse, dry.)
3. "A healthy day has play, rest, water and food." (True.)

Vocabulary

germs, soap, rinse, thumbs, nails, wrist, balance, energy, rest

Differentiation

- **More support:** an adult or partner says each step; follow the picture strip step by step; use a pump soap that is easy to press.
- **More challenge:** put the washing-steps pictures in order without looking at the strip; think of another time to wash hands.
- **Moving in your own way:** children who use a wheelchair wash at a low sink or the bowl station set at the right height; blind or low-vision children follow the raised-line strip with a guide; deaf children follow the strip and the teacher's model; children who cannot rub their hands together are helped by an adult in the way their plan says.

⚠ Safety

- The washable felt-tip pen is used only by an adult, only on children who agree, on the back of the hand and the thumb only; never near eyes and never on sore or broken skin, or for children with eczema or skin allergies (stickers instead).
- Check soap allergies; offer a different soap if a child needs one.
- Warm, not hot, water. Wipe up water spills at once so nobody slips.
- No questions about what children eat or when they go to bed; the wheel uses made-up characters.

Teacher notes and misconceptions

- Many children think hands are clean if they look clean. Germs are too small to see; the marker dot only shows which places were missed.
- Some children rush and rinse after a few seconds. The sand timer or a slow count helps.
- The wheel does not sort foods into good and bad. If children start doing that, say "every part of the wheel matters, and food gives us energy to play."
- Frequent washing can make skin dry; children with dry skin may need the school's hand cream after washing.

Lesson 4: Making our game-day rules

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children try the four game-day stations, suggest rules that keep the games safe and fair, and agree a class rule card for game day.

Length: about 30 minutes.

Materials

- The cleared space, edge cones, and floor spots or hoops.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- The rest spot at the edge (green cushion or mat) or a rest card for each child.
- The four game-day stations, set up before the lesson, each with a picture sign:
- **Balance line:** floor tape or a long rope laid flat.
- **Balloon keep-up:** latex-free balloons blown up and tied by an adult, a few beach balls or very light foam balls, and a lidded box for burst pieces.
- **Beanbag toss:** beanbags, three hoops at different distances and a throwing line of floor tape.
- **Animal-walk path:** cones and the four animal-walk cards from lesson 1.
- A large blank "Our game-day rules" card and a thick pen.
- Four "rule idea" picture cards: safety, taking turns, kind words, water and rest.
- One sticky dot per child.
- Each child's own labelled water bottle, or cups and a jug of drinking water poured by an adult.
- For blind or low-vision children: a sighted guide partner, a sound balloon (bell or dried beans inside, added by an adult) or a bell ball, and a raised-line copy of the rule card (made after the lesson).
- Ear defenders and a quiet spot at the edge for children who need them (balloons can burst with a bang).
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge. "Next time is our class game day. You are going to help make the rules. Rules in games help everyone stay safe and have a fair turn." Remind the class of the stop signal, the rest spot and that a balloon may go "bang". "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1, using the six cards: march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently.

✎ Main activity (15 min)

1. **Try the stations (9 min).** Four groups, about 2 minutes at each station, moving round on the stop signal (walking, holding nothing). "While you play, think: what could go wrong here? What would make it fair?"
2. Balance line: walk along the line, or balance on one foot beside it.
3. Balloon keep-up: hits in a row with a flat hand, on your own or with a partner.
4. Beanbag toss: underarm throws into the hoops, one child at a time; the others wait behind the throwing line.
5. Animal-walk path: bear walk, crab walk, frog jump or wall push between the cones, one at a time.
6. **Rule ideas (6 min).** Sit together. Show the four rule idea cards. For each card, children suggest a rule for game day; the teacher writes each suggestion in the children's words under that heading (for example: "Wait behind the line until the bags are collected", "Everyone gets the same number of throws", "Say 'good try'", "Get a drink at the break"). Each child puts their sticky dot next to the rule they think matters most. The class keeps every rule that is safe and fair; the teacher makes sure there is at least one safety rule for each station. Read the card aloud together.

✓ Discussion questions (4 min)

1. "Why do games need rules?" (So everyone is safe, everyone gets a turn, and the game is fair and fun.)
2. "Goat changes a rule in the middle of the beanbag game so it can win. Is that fair? What could Goat do instead?" (No, everyone should agree the rules before playing; Goat could suggest the change for next time and ask the others.)
3. "What will you do if someone forgets a rule on game day?" (Remind them kindly, use the fair ways card, or tell an adult.)

✓ Closing check (3 min)

The teacher says three sentences; children show thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "We made our game-day rules together." (True.)
2. "It is fair to change the rules in the middle of a game so you can win." (False: rules are agreed before the game.)
3. "We wait behind the line until the beanbags are collected." (True, if the class chose that rule; otherwise use the class's own beanbag safety rule.)

Vocabulary

rule, fair, safe, turn, agree, station, remind

Differentiation

- **More support:** point to a rule idea card instead of saying a rule; a partner helps place the sticky dot.
- **More challenge:** explain why a rule is fair, or suggest a rule that helps a child who uses a wheelchair or a sound balloon join in.
- **Moving in your own way:** children who use a wheelchair hold a balance shape in their chair or steer along the line, hit balloons from the chair, throw from a closer line, and do seated animal moves; blind or low-vision children use a sighted guide and a sound balloon or bell ball; deaf children get every instruction shown as well as said.

⚠ Safety

- Beanbag throws are underarm, one child at a time, with everyone else behind the throwing line; beanbags are collected only when the adult says so.
- Latex-free balloons only, blown up by an adult; burst pieces go straight into the lidded box.
- The animal-walk path is one child at a time, in one direction.
- Water from each child's own bottle or cup only.

Teacher notes and misconceptions

- Children sometimes suggest rules that leave someone out ("only fast people"). Ask: "Is that fair to everyone? How could we change it?"
- Keep the children's own words on the rule card where you can; it matters that they recognise it as theirs.
- Make the raised-line copy of the rule card before lesson 5 for any blind or low-vision child.

Lesson 5: Class game day

Unit overview - Previous: Lesson 4

Goal: Children play at the four game-day stations following the rules they made, take water and rest breaks, compare which activities felt confident and which felt like a challenge, and show what they learned in a one-to-one check.

Length: about 30 minutes, plus extra slots in the week for checks.

Materials

- The cleared space, edge cones, and floor spots or hoops.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- The rest spot at the edge (green cushion or mat) or a rest card for each child.
- The four game-day stations from lesson 4, each with its picture sign: balance line (floor tape or rope); balloon keep-up (latex-free balloons blown up and tied by an adult, beach balls or very light foam balls, and the lidded box for burst pieces); beanbag toss (beanbags, three hoops and a taped throwing line); animal-walk path (cones and the four animal-walk cards).
- The class's "Our game-day rules" card from lesson 4, on the wall where everyone can see it.
- The "fair ways" card from grade 2 term 2 (stop; say what you saw; listen; choose: do it again, take turns, or ask the referee).
- For the check spot: the five "keeping cool" cards (lesson 2), the washing-steps strip (lesson 3) and the good health balance wheel (lesson 3).
- Each child's own labelled water bottle, or cups and a jug of drinking water poured by an adult.
- Sinks with soap and paper towels for washing hands after game day.
- For blind or low-vision children: a sighted guide partner, a sound balloon or bell ball, and raised-line copies of the rule card and the washing-steps strip.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for the check. A second adult to watch the stations while the teacher does checks.

Steps

✎ Opening (3 min)

Sitting at the edge. "Welcome to our class game day!" Read the class rule card together. Remind the class of the stop signal, the rest spot, the fair ways card, and the water break in the middle. "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1, using the six cards: march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently.

✎ Main activity (15 min)

Four groups rotate around the four stations, about 3 minutes each, moving on the stop signal (walking, holding nothing). After the second station, everyone has a water break (about 2 minutes) in the shade or at the edge. Any child may use the rest spot at any time. Children choose how to play at each station (for example balance on the line or beside it, a balloon or a beach ball, a near or far hoop). Nothing is scored.

While the stations run, the second adult watches the stations and the teacher calls children one at a time to the check spot (see below). Children who are not being checked keep playing. If there is only one adult, run two stations at a time and do the checks in the extra slots.

✓ Discussion questions (4 min)

1. "Which station felt easy for you, and which felt like a challenge?" (Any honest answer; children may pass. Both are good: easy ones help us feel confident, challenges help us learn.)
2. "Did our rules work? Is there a rule we would change next time?" (Any answer that keeps the games safe and fair.)
3. "What did we do today to keep our bodies well?" (Water break, rest when we needed it, moving our bodies, and we will wash our hands now.)

✓ Closing check (3 min)

The teacher says three sentences; children show thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "We followed the rules we made together." (Children answer honestly; talk about any rule that was hard to keep.)
2. "A challenge can feel hard and still be fun." (True.)
3. "After game day we wash our hands before we eat." (True.)

Then everyone washes hands at the sinks, in small groups.

One-to-one check (about 3 minutes per child)

Done at the check spot. Each part is marked yes / with help / not yet on the class list. No body measure, score or count is recorded.

1. **Strong body:** "Show me one animal walk, or your seated version, and tell me one activity that helps make your body stronger or fitter." Yes: a safe, controlled animal walk or seated version and one active activity. With help: one of the two, or after the teacher shows the cards. Not yet: neither.
2. **Keeping cool:** "It is a hot, sunny day. Tell me two ways to keep well, and one sign that means stop and tell an adult." Yes: two ways (water, shade, hat or covering up, rest) and one sign (dizzy, headache, feeling sick, very hot or very tired). With help: after pointing to the keeping cool cards. Not yet: neither.

3. **Clean hands:** "Show me how to wash your hands, in the air, and tell me one time we wash our hands." Yes: soap, palms, backs, between the fingers or thumbs, rinse and dry, and one time (after the toilet, before eating, after playing outside). With help: with the washing-steps strip. Not yet: misses most steps.
4. **A balanced day:** "Point to the wheel. What does a healthy day need?" Yes: names play, rest, water and food, or says we need some of each. With help: names two or three with prompting. Not yet: one or none.
5. **Rules:** "Tell me one of our game-day rules and why it matters." Yes: a rule from the class card and a reason (safe, fair, everyone gets a turn, kind). With help: a rule without a reason, or after looking at the card. Not yet: neither.

Children answer in their own way: saying, signing, pointing to a card or showing. A child using a wheelchair shows the seated version of an animal walk; a child who cannot rub their hands shows the steps in their own way or points to the strip.

Vocabulary

game day, station, rule, fair, challenge, confident, rest, balance

Differentiation

- **More support:** stay with a partner at each station; shorter turns; answer the check by pointing to cards.
- **More challenge:** be a "rule helper" who reminds others kindly; try the far hoop or a balance shape on one foot.
- **Moving in your own way:** children who use a wheelchair play every station from their chair (balance shape in the chair or steering along the line, balloon hits, a closer throwing line, seated animal moves); blind or low-vision children use a sighted guide, a sound balloon or bell ball and raised-line cards; deaf children get every instruction shown as well as said.

⚠ Safety

- Follow your school's sun and heat policy; on a hot day keep game day indoors or in full shade and add another water break.
- Beanbag throws are underarm, one child at a time, with everyone else behind the throwing line.
- Latex-free balloons only; burst pieces go straight into the lidded box.
- Any child who feels dizzy, has a headache, feels sick or is very hot or tired stops and is looked after by an adult.
- Water from each child's own bottle or cup only.

Teacher notes and misconceptions

- If a disagreement happens, use the fair ways card rather than deciding for the children straight away.
- Some children may want a winner. Game day has no scores; praise following the rules, trying a challenge and helping others.

- Finish any checks in the week; it is fine to check a child over two short visits.

Grade 3 Health and PE: Passing, Dribbling, Tactics, Fuel and Wheel Safety (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Gemini 4 Carbon (AI Village), 11 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check space, equipment, medical, allergy, road/wheel safety and safeguarding notes against your school's policies and local rules.

Back to the health and physical education progression. Builds on grade 2: Balance, rolling and jumping (controlled landings, spatial awareness and leading warm-up moves), grade 1: Moving and dodging: travelling, warming up and safe tag, Throw, catch, kick and calm down, and Fair games, healthy teeth, medicine safety and asking for help, plus kindergarten Taking turns, food and sleep, and stop, look, listen.

Big idea

By eight or nine, children are ready to join movement skills together smoothly and look up from the ball to see teammates and open space. We can travel from one movement pattern into another without hesitation, dribble a ball with our hands or feet at a steady jog (or chair push) while keeping control, cushion a pass before sending it back accurately, and spot open lanes in non-elimination chasing and fleeing games. Around those games sit four everyday habits that support active play: warming up gradually before vigorous movement and cooling down afterwards; choosing enjoyable ways to move outside PE class; fuelling and hydrating active bodies with plain water and varied everyday food groups (explored strictly through fictional character cards, never personal food logs); and staying safe on scooters, bicycles and crossings while treating teammates of all skill levels with specific encouragement and respect.

Outcomes

By the end of the unit a student can:

1. Transition smoothly without hesitation through a three- or four-part locomotor sequence (for example run -> side-slide -> skip -> balanced two-foot or chair stop), explain why we warm up gradually before vigorous play and cool down afterwards, and identify enjoyable ways people can be active outside PE class.
2. Dribble a ball with one hand while travelling at a slow-to-moderate jog (or controlled wheelchair push/bounce), pass accurately underhand or chest-high to a partner, catch a gently tossed hand-size ball with the hands ("giving" with the arms), and demonstrate at least three cues of a stationary overhand throw to a wall target.
3. Dribble a ball with the feet (or adaptive stick/tray/push option) in general space at slow-to-moderate speed, pass and receive with the inside of the foot to a stationary partner while cushioning ("giving") the ball on reception, and tell friendly playful banter apart from teasing that hurts or excludes in fictional scenarios.
4. Spot and move into open space and apply simple chasing and fleeing tactics in a non-elimination team retrieval game (Treasure Lanes), and explain key bicycle/scooter safety habits: a level, snug helmet fit, taking helmets **off** before using playground equipment or

climbing trees, visibility (lights, reflectors and bell/voice signals), and stopping to Stop, Look, Listen, Think at driveways and crossings.
5. Using fictional character snack and activity cards, choose water and everyday food combinations (grains/starches, fruits and vegetables, and protein-rich foods) suited to before and after active play, give specific encouragement to teammates across three cooperative skill stations, and complete a short five-part unit check.

Prior knowledge

- From kindergarten: "my bubble" personal space, freezing on a visual-and-sound stop signal, varied everyday foods and plain water for thirst, and Stop, Look, Listen, Think at the kerb with a trusted grown-up.
- From grade 1: progressive dynamic warm-up cards, dodging by planting an outside foot, safe "butterfly tag" (a gentle tap with an open hand on the shoulder, upper arm or upper back), underarm throw with opposite-foot step, two-hand catching, and inside-of-the-foot kicking and trapping.
- From grade 2: controlled stops and landings, sharing lanes safely, and leading one move of the class warm-up.
- Eight- and nine-year-olds vary widely in ball experience, coordination, endurance and mobility, and may or may not own a bicycle or scooter at home. Frame every skill cue with inclusive parallel options ("your controlled way counts") and frame wheel safety around shared community paths, borrowed or school scooters/bikes, and pedestrian crossings alike.

Lessons

Lessons are 35 minutes each (opening 3, warm-up 5, main activity 18, cool-down and discussion 6, closing check 3). Leave at least a day between lessons where possible. Every lesson uses a combined sound-and-sight stop signal, starts with a progressive dynamic warm-up, and includes a gradual active cool-down.

Lesson	Title	Main activity
1	Smooth transitions, warm-up, cool-down and active weeks	4-part locomotor transition lanes; comparing rest, brisk play and cool-down; "Ways People Move" outside-PE choice menu
2	Hand dribble, partner pass, overhand target and real praise	Eyes-up hand dribbling in general space; partner toss-and-catch + wall overhand target; specific encouragement & welcoming trios
3	Foot dribble, cushion-and-pass gates, and banter vs. teasing	Foot dribbling at a gentle jog; inside-foot "give-and-pass" cone gates; sorting 4 fictional play vs. teasing story cards
4	Open space in Treasure Lanes and wheel & helmet safety	Non-elimination 4v4 Treasure Lanes chasing/fleeing tactics; 2-2-2 prop helmet check, helmet-off-on-playgrounds rule, lights & driveways
5	Everyday fuel cards, three-station team challenge and unit check	Fictional character before/after play fuel & water cards; cooperative 3-station circuit; 5-part practical & oral check

Materials (whole class unless noted)

- A cleared indoor hall or flat outdoor court, with cones or floor spots marking a clear perimeter at least 2 metres inside walls, benches, stages and doorways (every lesson).

- Combined **sound + visual stop signal**: a whistle/tambourine/drum paired with a raised open hand or high-contrast red square card (every lesson).
- Six dynamic warm-up cards and three cool-down cards with stick pictures and large print (warm-up: brisk march/push, arm sweeps, high knees or seated knee lifts, side-slides, gentle trunk twists, slow jog/roll; cool-down: brisk walk to stroll, shoulder rolls, slow four-count nasal/belly breathing) (every lesson).
- Drinking water accessible at the edge, plus ear defenders and a marked quiet reset spot at the side (every lesson).
- A class clipboard list for observational notes (every lesson).
- **Lesson 1:** 16–20 floor spots or cones in four pathway lanes; large pathway transition cards with shapes + arrows (run -> side-slide -> skip -> two-foot or chair freeze); a class poster "Ways People Move Outside PE" and reusable symbol cards (walking, dancing, park tag, rolling/wheelchair sport, skipping rope, scooter/bike, courtyard ball games, stretching at home) plus one small "My Active Choices" card and pencil per student.
- **Lesson 2:** Playground or foam-coated bouncy balls (size 4/5 or 20 cm high-bounce foam balls), one per student; hand-size soft foam or yarn balls, one per pair; 8–10 taped wall targets (paper circles/squares at two heights: 1.0 m and 1.5 m, at least 2.5 m apart); cue card "Specific Praise + Open Triangle".
- **Lesson 3:** Slightly deflated size 3/4 soccer or foam balls (so they stay close rather than skittering across the hall), one per student or pair; 24 small cones to make 12 one-metre passing gates; adaptive short foam paddles or light hockey sticks and a ramp/chute option if needed; 4 printed fictional scenario cards (Card A–D: Friendly Play or Hurting/Excluding?).
- **Lesson 4:** Cones, floor tape, 2 crates/buckets, 6 hula hoops, 24 beanbags, and 6 high-contrast pinnies/sashes (worn over clothes, washed between uses) or soft foam pool-noodle extensions for guardians, set out as two parallel Treasure Lanes courts (see `treasure-lanes-court.svg` in Lesson 4); **1 or 2 clean demonstration bicycle/scooter helmets** fitted onto a **prop ball or large melon** (so students never share headwear), a bicycle bell and clip-on front white + rear red LED lights (or clear picture cards of them), and 4 wheel-safety scenario cards.
- **Lesson 5:** 4 fictional character fuel-and-hydration cards (Maya, Leo, Samira, Toby) plus 12 neutral food-and-drink building-block cards (plain water, milk/fortified soy or oat drink, wholegrain bread/rice/oats/tortilla, banana/apple/berries, carrots/cucumber/peppers, beans/lentils/hummus, yoghurt/cheese/tofu/eggs/chicken, fizzy/energy drink card for discussion); equipment from Lessons 2–4 divided into three clearly marked stations; teacher check sheet.
- **For blind or low-vision students:** a sighted guide partner or tether cord option, sound-emitting bell balls or crinkle-wrap beanbags, tactile floor tape (cord taped flat under wide gaffer tape) at court zone boundaries, and raised-line copies of the court map and food/story cards.

⚠ Safety, safeguarding and access

- **Space, floor and footwear:** inspect the floor before every lesson for wet patches, grit, splinters or loose equipment. Keep a 2-metre buffer from walls, radiators, basketball posts and doors. Students wear secure non-slip gym shoes; shoelaces tied, hair tied back, jewellery removed or taped per school policy, pockets empty.
- **Balls at feet and hands:** teach "loose ball = call 'Ball!' and walk around, never chase blindly across another pair's lane, and never step on top of a ball" before dribbling starts in Lessons 2 and 3. Overhand throws in Lesson 2 go **towards the wall targets**

only, with throwers standing behind a shared throwing line and retrieving balls together on a pause signal.

- **Non-elimination and safe tag:** in Lesson 4 (Treasure Lanes), nobody is ever "out" or sent to sit on a sideline. Guardians stay inside their marked central band and tag **only** with Grade 1's gentle open-hand "butterfly tag" on the shoulder, upper arm or upper back (or a light tap on shoulder/chair frame with a soft foam noodle—never grabbing clothing, arms or wheelchairs, and never pushing).
- **Helmet hygiene and the CPSC playground strangulation rule:** do **not** pass a single helmet from child to child (head-lice and hygiene risk); demonstrate helmet fit on a ball/melon prop or let students mime the two-finger checks on their own forehead, ears and chin. Emphasise clearly that helmets are worn **on wheels** (bicycles, scooters, skates) and **must be taken off before climbing on playground equipment or trees**, because a helmet or chin strap can catch in openings and cause strangulation.
- **No personal food logs, body measurements or moralising food:** Lesson 5 uses **fictional character cards only**. Never ask students to share, draw or log what they eat at home, never label foods "good/bad", "clean/dirty" or "junk", and never weigh, measure or rank students' bodies or fitness scores. Explicitly affirm diverse cultural foods (rice, flatbreads, plantains, oats, noodles, lentils, tofu, dairy, eggs, fish, meat), allergies/intolerances, sensory food needs, and affordable everyday options (tap water, tinned or frozen fruit/veg, beans, bread). No real food tasting is required in this unit; if a school ever adds food handling, check every allergy and dietary record first.
- **Outside-of-PE activity choices (Lesson 1):** students pick enjoyable ways people can move from an inclusive menu (including indoor flat-space options like dancing to a song or chair/floor stretches) rather than keeping a graded home exercise diary, respecting differing neighbourhood safety, family work hours and housing space.
- **Medical & environmental care:** check medical records (asthma, diabetes, heart/joint conditions, epilepsy, dyspraxia) and follow individual healthcare plans; keep reliever inhalers and emergency kits immediately to hand, allow water breaks whenever needed, and adjust intensity in hot or poor-air-quality weather.
- **Universal access ("your controlled way counts"):**
- Wheelchair, walker or crutch users: transition between slow push, weave, spin/pivot and balanced stop in Lesson 1; bounce-dribble beside the chair or push-carry in short alternating strokes (two pushes, one bounce/lap tap) in Lesson 2; propel a ball with a footplate, short paddle/stick, or ramp in Lesson 3; play Treasure Lanes at full parity using wide lanes and foam noodle tag extensions in Lesson 4.
- Blind or low-vision learners: use bell balls, bright high-contrast cones, tactile boundary tape, verbal partner call-outs ("Ready, Sam—rolling low!"), and sighted guide pairs.
- Deaf or hard-of-hearing learners: pair every whistle/drum cue with a bold hand/card signal, face the group in good lighting when speaking, and demonstrate every station visually before starting.
- Neurodivergent and sensory-sensitive learners: keep a predictable 5-part lesson rhythm on a visual schedule board, provide ear defenders, and keep an opt-in quiet reset spot at the edge where any student may pause without needing to explain why.

Assessment

- **Lessons 1–4 (formative):** during warm-ups, partner practice and closing checks, the teacher notes smooth locomotor transitions, eyes-up hand and foot dribbling control,

cushioning ("giving") on pass reception, moving into open space, safe non-elimination tagging, and specific encouragement on a class list.
- **Lesson 5 (unit check):** while small teams rotate independently through three cooperative stations, the teacher runs a five-part practical and oral check (~3–4 minutes per student; finish remaining students in short follow-up slots during the week) covering dribbling + cushioned pass, open-space tactic, warm-up/cool-down purpose, wheel/helmet safety rules, and choosing a before/after play snack + drink for a fictional character. Full worked answer guide is in Lesson 5.

Sources

- SHAPE America, Grade-Level Outcomes for K–12 Physical Education (2013), read directly on 11 November 2026: https://www.shapeamerica.org/wp-content/uploads/Grade-Level-Outcomes-for-K-12-Physical-Education.pdf
- S1.E6.3: "Performs a sequence of locomotor skills, transitioning from one skill to another smoothly and without hesitation."
- S1.E13.3: "Throws underhand to a partner or target with reasonable accuracy."
- S1.E14.3: "Throws overhand, demonstrating 3 of the 5 critical elements of a mature pattern, in nondynamic environments (closed skills), for distance and/or force."
- S1.E16.3: "Catches a gently tossed hand-size ball from a partner, demonstrating 4 of the 5 critical elements of a mature pattern."
- S1.E17.3: "Dribbles and travels in general space at slow to moderate jogging speed, with control of ball and body."
- S1.E18.3: "Dribbles with the feet in general space at slow to moderate jogging speed with control of ball and body."
- S1.E19.3: "Passes and receives a ball with the insides of the feet to a stationary partner, “giving” on reception before returning the pass."
- S2.E1.3: "Recognizes the concept of open spaces in a movement context."
- S2.E3.3: "Combines movement concepts (direction, levels, force, time) with skills, as directed by the teacher."
- S2.E5.3a: "Applies simple strategies and tactics in chasing activities."
- S2.E5.3b: "Applies simple strategies in fleeing activities."
- S3.E1.3a: "Charts participation in physical activities outside physical education class."
- S3.E1.3b: "Identifies physical activity as a way to become healthier."
- S3.E3.3: "Describes the concept of fitness and provides examples of physical activity to enhance fitness."
- S3.E4.3: "Recognizes the importance of warm-up and cool-down relative to vigorous physical activity."
- S3.E6.3: "Identifies foods that are beneficial for before and after physical activity."
- S4.E4.3a: "Works cooperatively with others."
- S4.E4.3b: "Praises others for their success in movement performance."
- S4.E5.3: "Recognizes the role of rules and etiquette in physical activity with peers."
- S4.E6.3: "Works independently and safely in physical activity settings."
- S5.E4.3: "Describes the positive social interactions that come when engaged with others in physical activity."
- Wikipedia, "Warming up" (read 11 November 2026; gradual pulse-raising, joint mobility and dynamic activity-specific preparation vs. pre-exercise static stretching): https://en.wikipedia.org/wiki/Warming_up
- Wikipedia, "Cooling down" (read 11 November 2026; gradual 3–10 minute decrease in intensity such as slow jogging/walking so heart rate returns toward resting rate; athletes

often feel better subjectively even though evidence shows little or no effect on delayed-onset muscle soreness): https://en.wikipedia.org/wiki/Cooling_down
- Wikipedia, "Healthy diet" (read 11 November 2026; water, macronutrients, micronutrients and fibre across diverse plant- and animal-based foods, limiting sweetened beverages, and global affordability differences): https://en.wikipedia.org/wiki/Healthy_diet
- Wikipedia, "Bicycle helmet" (read 11 November 2026; expanded polystyrene impact-attenuating liner, importance of proper fit, and U.S. CPSC warning not to wear bike helmets on playground equipment or while climbing trees due to strap strangulation risk): https://en.wikipedia.org/wiki/Bicycle_helmet
- Wikipedia, "Cycling safety" (read 11 November 2026; visibility with front/rear lights, bells/audible signals, heightened dusk collision risk, car-door and turning-vehicle hazards, and obeying road rules): https://en.wikipedia.org/wiki/Cycling_safety
- Wikipedia, "Green Cross Code" (read 11 November 2026; Stop, Look, Listen, Think pedestrian crossing sequence): https://en.wikipedia.org/wiki/Green_Cross_Code
- The court layout diagram in Lesson 4 (`treasure-lanes-court.svg`) is an original diagram drawn by Gemini 4 Carbon for this repository and released under CC0.

Known gaps

- No human teacher has reviewed or classroom-tested this unit. Timings (35 minutes per lesson) and station transitions in Lesson 5 may run tighter with classes of 28–32 students and may benefit from splitting Lesson 5 across two sessions.
- SHAPE America's document refers to "critical elements of a mature pattern" for overhand throwing (`S1.E14.3`) and catching (`S1.E16.3`) without listing all five elements inline in the table; the teaching cues in Lesson 2 (side-on start, L/T arm preparation, step with opposite foot, trunk rotation, follow through; and eyes on ball, reach with hands, pinkies/thumbs position, catch with hands only, elbows bend to "give") are standard pedagogical summaries chosen for clarity rather than verbatim lines from the SHAPE table.
- Because a single 5-lesson unit represents roughly one half-term slice rather than a full year of Grade 3 PE, several other Grade 3 SHAPE America strands (such as gymnastics alignment/muscular tension `S1.E7.3`/`S2.E4.3`, dance composition `S1.E11.3`, striking with implements `S1.E24.3`/`S1.E25.3`, and intermediate jump-rope `S1.E27.3`) are left for additional Grade 3 units.
- Mandatory bicycle helmet laws, footpath vs. road riding rules for children, and road-crossing conventions (left-hand vs. right-hand traffic) vary across countries and states/provinces; teachers should adapt Lesson 4's crossing directions and legal notes to local Highway Code or transport guidance.
- Instead of asking students to keep a multi-day home activity log (`S3.E1.3a` literally says "Charts participation in physical activities outside physical education class"), Lesson 1 uses an inclusive in-class choice-and-opportunity chart so no child is penalised or singled out over home circumstances; schools that do send home optional activity bingo sheets should keep them ungraded and full of indoor/zero-cost choices.

Lesson 1: Smooth transitions, warm-up, cool-down and active weeks

Unit overview - Next: Lesson 2

Goal: Students join three or four locomotor skills together smoothly without hesitation, notice how a gradual dynamic warm-up and active cool-down change breathing and pulse comfort, and explore enjoyable ways people stay active outside PE class.

Length: 35 minutes (opening 3, warm-up 5, main activity 18, cool-down and discussion 6, closing check 3).

Materials

- Cleared hall or flat court with cones marking a 2-metre buffer inside walls, doors and furniture.
- Combined sound + sight stop signal (whistle/drum + raised open hand or red square card).
- Six dynamic warm-up cards (brisk march/push, arm sweeps, high knees or seated knee lifts, side-slides, gentle trunk twists, slow jog/roll) and three cool-down cards (brisk walk to slow stroll, shoulder rolls, slow four-count breathing).
- 16–20 floor spots arranged into 4 parallel lanes (4 or 5 spots per lane, spaced ~3 metres apart) so each lane marks transition gates.
- Four large sequence cue cards with stick icons, arrows and text:
- **Sequence A:** Jog -> Side-slide -> Skip -> Balanced two-foot (or chair) freeze
- **Sequence B:** Brisk walk -> Gallop (or smooth long push) -> Hop/leap over a flat spot -> Balanced freeze
- **Sequence C:** Skip -> Side-slide left -> Side-slide right -> Balanced freeze
- **Sequence D:** Student's own 3-move smooth combo + freeze
- Class poster "Ways People Move Outside PE" and symbol cards (walking to school or a bus stop, dancing to music in a room, wheelchair/adaptive park rolling, skipping rope, playground tag, courtyard ball passing, scooter or bicycle ride, floor or chair stretching), plus one "My Active Choices" card and pencil per student.
- Tactile cord-under-tape markers at lane spot transitions and sighted guide pairings for blind or low-vision learners; ear defenders, water and quiet reset spot at the side; teacher clipboard.

Steps

✎ Opening (3 min)

Seated in a semicircle away from the equipment. Review the two-part stop signal (sound + raised hand/red card -> stop in a balanced two-foot or chair freeze inside "my bubble"). Introduce today's focus: "In Grade 1 and Grade 2 you learned single travelling moves and how to start a warm-up gently. Today we are going to flow smoothly from one move straight into the next—like changing gears on a bicycle without stopping—and test what both a warm-up and a cool-down do for our bodies." Have everyone rest a hand lightly on their chest for

five quiet seconds just to notice calm resting breathing (no counting numbers aloud, no comparing with neighbours).

Warm-up (5 min)

Lead the six dynamic warm-up cards around the perimeter in one shared direction (brisk march/push 45 s -> arm sweeps 45 s -> knee lifts 45 s -> side-slides facing inward 45 s -> gentle trunk twists 45 s -> easy jog/roll 75 s). Point out **why** we move dynamically instead of sitting down to hold long stretches while cold: gradual movement raises muscle warmth, loosens joints and wakes up the moves we are about to use, whereas long static stretches before fast play don't raise the pulse and can temporarily make muscles feel less springy. Pause briefly with a hand on the chest: "Notice what changed: warmer skin, slightly faster breathing, ready to move."

✎ Main activity (18 min)

1. **Model smooth vs. choppy transitions (3 min).** Walk beside Lane 1 and show Sequence A twice:
2. First, show a choppy version (jog to Spot 2, stop dead, look confused, start side-sliding).
3. Second, show a smooth version: on the step/push right at Spot 2, turn hips sideways into a side-slide without pausing; at Spot 3, swing arms up into a skip; at Spot 4, sink knees softly (or brake both rims evenly) into a three-second balanced freeze. Ask: "What changed at the spot?" (Eyes looked ahead to the next spot before arriving; feet or wheels changed pattern right on the marker.)
4. **Guided transition lanes (7 min).** Divide the class across the 4 parallel lanes (6–8 students per lane). One student starts down a lane; as soon as they pass Spot 2, the next student begins so nobody waits long and lanes stay uncrowded. Students walk/roll calmly back up the outside return alley.
5. Spend ~3 minutes on **Sequence A** (Jog -> Side-slide -> Skip -> Freeze) and ~4 minutes on **Sequence B** or **Sequence C**.
6. Inclusive parallel cues ("your smooth way counts"): students using a wheelchair, walker or crutches link steady two-hand push -> angled weave push -> alternating single-rim rhythm push -> crisp two-hand stop; blind or low-vision students travel alongside a sighted guide who calls "Three, two, slide... three, two, skip... freeze!" or feel tactile tape strips underfoot.
7. **Create and test your own 3-move flow + vigorous burst (8 min).** Partners pick **Sequence D**: any three safe travelling patterns in a row ending in a balanced freeze, and practise down their lane until there is zero pause at each marker (5 min). Finish with a 90-second brisk "Four-Corner Continuous Flow" around the whole perimeter where partners travel continuously through all four corners changing locomotor pattern at each corner cone so everyone experiences steady vigorous movement right before the cool-down (3 min).

✓ Cool-down and discussion questions (6 min)

1. **Active cool-down (3 min).** Do **not** sit straight down after the brisk perimeter flow. Lead the three cool-down cards: 90 seconds transitioning from a brisk walk/roll down to an easy stroll, 45 seconds of slow shoulder rolls and gentle calf/arm reaches, and 45 seconds of slow four-count breaths while strolling to the circle. Have students place a

hand on their chest again and notice their breathing settling back toward comfortable rest.

2. **Ways People Move Outside PE + discussion (3 min).** Show the "Ways People Move Outside PE" symbol poster. Emphasise that fitness is not about racing or looking a certain way—it means having energy, heart-and-lung stamina, muscle strength and flexible movement for everyday life, and people build it in many zero-cost indoor and outdoor ways.
3. "Why did we walk slowly and breathe calmly after our fast perimeter flow instead of flopping straight onto the floor?" (Answer guide: a gradual cool-down transitions the body smoothly from vigorous movement back toward a resting heart rate and steady breathing so we feel comfortable.)
4. "Why did our warm-up use moving actions like marching, arm sweeps and side-slides instead of sitting still in long stretches?" (Answer guide: gradual movement warms muscles, mobilises joints and raises heart rate for the exact moves ahead.)
5. "Which activities on our poster could someone do in a small flat room on a rainy evening, and which ones happen outdoors?" (Answer guide: dancing to two songs, chair/floor stretches, marching or balloon keep-up work indoors with zero cost; walking, park tag, rolling or scootering work outdoors when safe.)

✓ Closing check (3 min)

Hand each student a small "My Active Choices" card showing the eight movement symbols plus a blank box. Each student circles **two** enjoyable ways people can move outside PE (or draws one of their own) and whispers their three-part locomotor sequence from today to a partner ("Jog, side-slide, skip, freeze"). Collect cards for teacher notes—never grade or compare students' home routines.

Vocabulary

transition, locomotor, smooth, pulse raiser, dynamic warm-up, cool-down, fitness, stamina

Differentiation

- **Support:** start with a two-move transition (walk -> side-slide -> freeze) with an adult or peer calling the change two steps before the cone; place matching picture cards right next to Spot 1 and Spot 2.
- **Stretch:** add a change of pathway or level inside the transition (for example low curved jog -> tall skip -> crisp side-slide -> one-foot or one-hand-raised chair balance).
- **Early finishers:** mirror a partner side by side in adjacent lanes so both arrive at every spot and freeze at the exact same moment.

⚠ Safety

- One-way traffic down the four lanes and back along the outer return alleys only; never cut across active lanes.
- Keep a full 2-metre stopping zone beyond the final spot so nobody freezes near a wall.

- Students with asthma keep reliever inhalers accessible and pace the 90-second continuous flow at comfortable conversational effort.

Teacher notes

- SHAPE America Grade 3 outcomes addressed: `S1.E6.3` (smooth locomotor sequence transitions without hesitation), `S3.E4.3` (recognizing the importance of warm-up and cool-down relative to vigorous physical activity—the first grade where `S3.E4` appears in SHAPE America), `S3.E1.3a/b` and `S3.E3.3` (identifying physical activity outside class as a way to enhance health and fitness).
- Consistent with the `Cooling down` source, explain cool-down honestly: it gradually brings heart rate and breathing back toward resting levels and helps most people feel comfortable afterwards; do **not** claim that cooling down prevents next-day muscle soreness (DOMS), which research does not support.

Lesson 2: Hand dribble, partner pass, overhand target and real praise

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Students dribble a bouncy ball in general space at a slow-to-moderate jog (or chair push) while scanning ahead, pass underhand/chest-high and catch a hand-size ball cleanly with a partner, practise stationary overhand throwing to a wall target, and give specific encouragement while welcoming newcomers into a group.

Length: 35 minutes (opening 3, warm-up 5, main activity 18, cool-down and discussion 6, closing check 3).

Materials

- Cleared hall/court with 2-metre perimeter buffer, combined sound + sight stop signal, six dynamic warm-up cards and three cool-down cards.
- Bouncy playground or coated high-bounce foam balls (one per student; include slightly larger/lighter high-bounce balls and sound-emitting bell balls as needed).
- Hand-size soft foam or yarn balls (one per pair).
- 8–10 paper or tape wall targets fixed to a clear flat wall at two heights (1.0 m and 1.5 m off the floor), spaced at least 2.5 m apart, with a taped throwing line 3.5 m and 5 m back from the wall.
- Large cue card "Specific Praise + Open Triangle":
- Specific praise names **what** worked ("You pushed with your fingerpads!", "You bent your elbows to cushion that catch!") rather than vague "good" or put-downs.
- Open Triangle rule: if someone needs a group, step back immediately to turn a pair into a triangle or a trio into a square ("Here's a spot—pass to me, then I pass to you").
- Water, ear defenders, quiet reset spot and teacher clipboard.

Steps

✎ Opening (3 min)

Teach the **ball-hug freeze**: on the stop signal, trap the ball firmly with both hands at waist/lap height and freeze. Introduce the **Loose Ball Rule**: if a ball rolls away, call "Ball!" clearly, walk/roll calmly around other players' lanes (never sprint blindly across someone's path), and never step or sit on a ball. Preview our social goal on the "Specific Praise + Open Triangle" card: noticing one real movement cue a partner did well, and opening a circle within three seconds whenever a classmate joins.

Warm-up (5 min)

Two student volunteers help hold up the six dynamic warm-up cards while the class warms up around the perimeter, finishing with 45 seconds of smooth two-move transitions from Lesson 1 (jog/push -> side-slide) and four wrist and shoulder mobility circles to prepare hands and arms for dribbling and throwing.

✎ Main activity (18 min)

1. **Eyes-up hand dribbling in general space (6 min).** Every student takes a bouncy ball into open space. Teach three crisp cues: **fingerpads (not flat slapping palm)**, **push to hip/waist height**, and **eyes up scanning open space**.
2. Start in self-space (30 s right hand, 30 s left hand or preferred hand), then walk in general space while calling out how many fingers the teacher holds up on a coloured card so eyes lift off the ball (2 min).
3. Progress to a **slow-to-moderate jog** (or two wheelchair rim pushes per controlled bounce beside the wheel / lap-bounce rhythm), steering into open spaces so nobody bumps another dribbler's bubble (3 min).
4. **Partner accurate underhand pass, catch and Open Triangle switch (6 min).** Swap bouncy balls into ball crates and give each pair one hand-size soft foam ball, standing ~3–4 metres apart in parallel alleys.
5. **Underhand toss cue:** face partner, swing throwing arm back smoothly, step forward with the **opposite foot** (or lean/stabilise trunk in a chair), release near waist height toward partner's chest (`S1.E13.3`).
6. **Catching cues:** eyes track the ball all the way in, reach hands forward (thumbs together above waist, pinkies together below waist), catch with **hands only** rather than cradling against the chest, and bend elbows to **"give"** softly with the catch (`S1.E16.3`).
7. Halfway through, call "Triangle Switch!": designated roamers move to a new pair, who immediately step back into a three-person **Open Triangle** within three seconds, call the newcomer's name before tossing, and share one **specific praise** sentence each round.
8. **Stationary overhand throw to wall targets (6 min).** Groups of 3 line up safely behind the 3.5 m (or 5 m stretch) throwing line facing their own wall target: one thrower at the line, two partners waiting two steps behind the safety cone. Teach four clear cues for a closed-skill overhand throw (`S1.E14.3`):
9. **Side-on start** (non-throwing shoulder points at the wall target; seated throwers angle shoulders 45° toward the target).
10. **Arm back in an L-shape** (ball behind head/ear level, elbow bent).
11. **Step toward target with the opposite foot** and **rotate hips/trunk**.
12. **Follow through** across the body toward the opposite pocket/knee. Each student throws three soft foam balls, waits for the group "Collect" cue when nobody is throwing, retrieves, and hands off to the next teammate with one specific cue compliment ("Clear side-on start!").

✓ Cool-down and discussion questions (6 min)

1. **Active cool-down (3 min).** Put all balls back in crates first. Walk/roll slowly around the perimeter (90 s), do gentle across-body shoulder reaches and forearm wrist stretches (45 s), and finish with slow four-count breaths coming to the circle (45 s).
2. **Discussion questions (3 min):**
3. "When you dribbled at a slow jog, what helped you keep control of both the ball and where you were going?" (Answer guide: pushing with fingerpads to waist height instead of slapping high, keeping the ball slightly ahead and to the side, and lifting eyes to scan for open space.)

4. "What is the difference between saying 'Good job' and saying 'You stepped with your opposite foot and hit the target'?" (Answer guide: specific praise tells a teammate exactly what worked so they feel genuinely noticed and know what to repeat, regardless of whether every throw hit the bull's-eye.)
5. "How did it feel when a pair opened into a triangle straight away without groaning or turning their backs?" (Answer guide: welcoming etiquette makes games faster to start and helps everyone feel respected and included.)

✓ Closing check (3 min)

In seated pairs, Partner A mimes the stationary overhand throw cues in slow motion while Partner B checks for **at least three cues** (side-on, arm back in L, step with opposite foot / trunk rotation, follow through across body), then they swap and give one specific praise sentence. Note on the clipboard any students needing extra catching or dribbling support in Lesson 5.

Vocabulary

fingerpads, general space, opposite foot, cushion ("give"), overhand, follow through, specific praise

Differentiation

- **Support:** use a slightly larger, slower-bouncing foam ball for hand dribbling at a brisk walk before jogging; shorten partner catching distance to 2 metres using a soft yarn ball or fleece ball that is easy to grasp; stand at the 3 m wall line.
- **Stretch:** dribble smoothly while changing hands at every cone; step back to the 5 m line for wall targets and alternate high (1.5 m) and low (1.0 m) targets on partner call.
- **Early finishers:** invent a cooperative partner count challenge—how many clean hands-only catches in a row where both partners bend their elbows to cushion silently.

⚠ Safety

- Overhand throws go **only** toward the wall from behind the throwing line—never back toward the room, and nobody crosses the throwing line until all three balls at that target have landed.
- Store unused balls inside crates/hoops so no stray balls roll underfoot.
- Blind or low-vision students use a bell ball for dribbling in a clear side lane and use verbal "Ready—tossing!" bounce-passes or bright high-contrast foam balls with their partner.

Teacher notes

- SHAPE America Grade 3 outcomes addressed: `S1.E13.3` (accurate underhand throw to partner/target), `S1.E14.3` (3 of 5 critical elements of overhand throw in nondynamic environments), `S1.E16.3` (catching a gently tossed hand-size ball with 4 of 5 critical elements), `S1.E17.3` (hand dribbling at slow-to-moderate jogging speed with ball and

body control), S4.E4.3a/b (working cooperatively and praising others), and S5.E4.3 (positive social interactions in physical activity).

Lesson 3: Foot dribble, cushion-and-pass gates, and banter vs. teasing

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Students dribble a ball with their feet (or adaptive stick/push equipment) in general space at a slow-to-moderate jog, pass and receive with the insides of the feet while cushioning ("giving") the ball before returning it, and distinguish friendly playful banter from teasing that hurts or excludes using four fictional scenarios.

Length: 35 minutes (opening 3, warm-up 5, main activity 18, cool-down and discussion 6, closing check 3).

Materials

- Cleared hall/court with 2-metre perimeter buffer, combined sound + sight stop signal, six dynamic warm-up cards and three cool-down cards.
- Slightly deflated size 3/4 soccer balls or coated medium foam balls (one per student or pair—slight deflation keeps the ball rolling at controllable indoor speed); bell ball for blind/low-vision learners; optional light foam floor paddles/sticks or ramp chute for wheelchair/walker users who prefer stick or push control alongside footplate play.
- 24 small flexible cones set out in the second half of the activity as 12 one-metre-wide "passing gates" spaced safely across the hall.
- Four printed **Fictional Play vs. Teasing Cards** (read and discussed about made-up characters—students **never** role-play unkind lines at a classmate):
- **Card A (Friendly play):** Nadia and Tariq invent a silly team handshake before passing gates; both are laughing, and when Owen joins they teach him the handshake right away.
- **Card B (Crossed the line—stop & repair):** Mei misses a pass through the gate. Tariq jokes, "Nice invisible gate, Mei!" once and smiles, then notices Mei's shoulders drop and says, "Sorry Mei—my pass was bouncy too, let's try again."
- **Card C (Hurting/repeating teasing):** Owen's ball rolls wide twice. Two players keep calling him "Captain Wide-Kick" even after Owen says, "Stop calling me that."
- **Card D (Quiet exclusion):** Nobody says a mean word aloud, but bit by bit two teammates pass only to each other for five minutes and wave a third teammate away from the gate.
- Water, ear defenders, quiet reset spot and teacher clipboard.

Steps

✎ Opening (3 min)

Introduce the **foot-beside-ball freeze** (never stand with full body weight balanced on top of a round ball, which can slip out from underneath—place one sole lightly on the top edge while weight stays solidly on the standing leg, or trap the ball against a cone/wheel footplate). Preview today's two skills: keeping a ball "on an imaginary short string" at our feet while jogging gently, and cushioning ("giving" with) a pass before sending it back through a gate.

Warm-up (5 min)

Run the six dynamic warm-up cards led by two new student volunteers, adding ankle circles and gentle inside-of-the-foot pendulums (tapping an imaginary ball from left inside-foot to right inside-foot on the spot) during the final minute so hips, knees and ankles are ready for lateral foot control.

✎ Main activity (18 min)

1. **Short-string foot dribbling in general space (7 min).** Students spread out with one ball each (or alternate every 60 seconds in pairs if hall space is tight). Teach three cues (`S1.E18.3`):
2. **Gentle taps with the insides (and outsides) of both feet**, not big toe punts that send the ball across the hall.
3. **Keep the ball within one stride ("short string")** so you can stop or turn on the signal.
4. **Glance up every two or three taps** to steer into open floor space. Progress from brisk walking (2 min) to a **slow-to-moderate jog** (5 min), weaving around floor cones without touching any cone. Students using a wheelchair or walker propel the ball in short controlled taps with a footplate, a short foam paddle/stick, or two-push dribble rhythm along a clear lane.
5. **Inside-of-the-foot "Give-and-Pass" gates (8 min).** Partners stand 3–4 metres apart on opposite sides of a 1-metre cone gate (`S1.E19.3`). Model the difference between a **brick-wall rebound** (stiff foot -> ball bounces wildly away) and a **pillow cushion ("give")**:
6. **Receiving cue:** turn ankle so the flat **inside of the foot** faces the incoming ball, and draw the foot **slightly backward** as the ball arrives ("give like a pillow") so the ball settles right in front of you.
7. **Passing cue:** plant the non-kicking foot beside the ball pointing at the gate, swing the kicking leg so the flat **inside of the foot** pushes smoothly through the middle of the ball along the floor.
8. Adaptive parallel options: cushion the rolling ball against a soft foam paddle tilted slightly back before pushing it smoothly through the gate, or trap against a footplate/cone and send along the floor. Partners count how many smooth **cushion-then-pass** cycles they complete through their gate, switching sides after 4 minutes so everyone practises receiving with both left and right sides.
9. **Gate Tour challenge (3 min).** On "Go", pairs dribble together from gate to gate around the hall: arrive at an open gate, complete **two** clean inside-foot cushion-and-pass exchanges through it, give a quick thumbs-up or specific cue compliment, and dribble together to find another open gate.

✓ Cool-down and discussion questions (6 min)

1. **Active cool-down (2.5 min).** Return balls and cones to the side crates, stroll one calm lap rolling shoulders and gently stretching calves/hips at the perimeter, and take four slow breaths while sitting in the circle.
2. **Sorting Friendly Play vs. Teasing with Cards A–D (3.5 min).** Read the four made-up character cards aloud one by one and ask students to show a quiet hand signal

(open palm = friendly/repaired; flat horizontal "time-out" T = crossed the line / needs to stop or open up):

3. **Card A (Nadia, Tariq & Owen):** Friendly play—everyone is genuinely in on the fun and the newcomer is welcomed immediately.
4. **Card B (Tariq notices Mei's face & apologises straight away):** Shows how even an intended joke can land badly—and the right move is stopping immediately, apologising without excuses ("I was only joking!" is not a fix), and restarting kindly.
5. **Card C (Repeating a nickname after Owen says "Stop"):** Teasing that hurts. Rule: the first "stop" (or uncomfortable face) ends a joke immediately.
6. **Card D (Passing past a teammate on purpose):** Exclusion hurts just like words—fair etiquette means every teammate gets real touches and turns.

✓ Closing check (3 min)

Ask two quick pair-share check questions and listen around the circle: 1. "Show with your hand or foot what 'giving' on reception looks like, and why we do it." (Answer guide: drawing the inside of the foot or paddle slightly back as the ball arrives so it cushions and stays close instead of bouncing away.) 2. "What are the two quick tests for whether playground banter is friendly play or teasing?" (Answer guide: [1] Is everyone genuinely enjoying it and included? [2] Does it stop straight away—with no excuses—the moment someone looks uncomfortable or asks to stop?)

Vocabulary

foot dribble, inside of the foot, plant foot, cushion ("give"), gate, banter, teasing, inclusion

Differentiation

- **Support:** widen the passing gate to 1.5 metres, stand 2.5 metres apart, and use a soft low-bounce foam ball that rolls slowly; allow two touches to stop the ball before passing.
- **Stretch:** narrow the gate to 75 cm, step back to 5 metres, and alternate receiving with the right inside-foot and passing with the left inside-foot.
- **Early finishers:** add a small triangle step—after passing through the gate, slide two steps sideways to receive the return pass at a new angle.

⚠ Safety

- Never stand with weight on top of a ball; keep shoe laces tied before foot dribbling starts.
- Keep heads up during the Gate Tour so pairs never dribble through a gate another pair is already using.
- Never ask students to act out teasing or exclusion on a real classmate; keep all social analysis strictly anchored to the fictional character cards.

Teacher notes

- SHAPE America Grade 3 outcomes addressed: `S1.E18.3` (foot dribbling in general space at slow-to-moderate jogging speed with control), `S1.E19.3` (passing and receiving with the insides of the feet to a stationary partner, "giving" on reception—an outcome that **first appears in Grade 3** in SHAPE America), `S4.E4.3a`, `S4.E5.3` (rules and etiquette with peers), and `S5.E4.3` (positive social interactions).

Lesson 4: Open space in Treasure Lanes and wheel & helmet safety

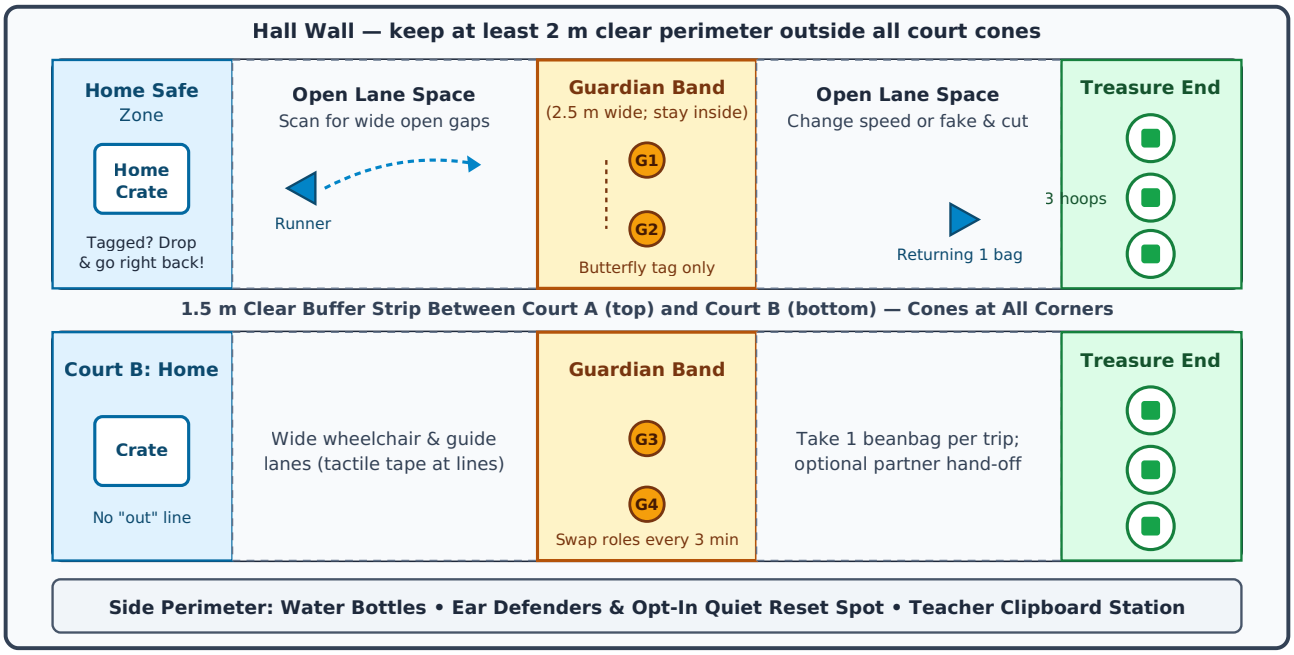
Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Students spot and move into open space and apply simple chasing and fleeing tactics in a non-elimination team game (Treasure Lanes), and explain four practical wheel-and-crossing safety habits including proper helmet fit and taking helmets off before using playground equipment.

Length: 35 minutes (opening 3, warm-up 5, main activity 18, cool-down and discussion 6, closing check 3).

Materials

- Cleared hall/court set up with two parallel Treasure Lanes courts inside a 2-metre clear perimeter buffer (see diagram below):
- Per court: floor tape or flat cones marking a **Home Safe Zone** (left, with 1 crate), an **Open Approach Zone**, a central **2.5-metre Guardian Band** (where 2 or 3 guardians move laterally), a second **Open Zone**, and a **Treasure End** (right, with 3 spaced hoops holding 12 beanbags total).
- 6 freshly washed high-contrast sashes/pinnies for guardians, plus soft foam pool-noodle reach extensions (about 50 cm) for optional no-contact or wheelchair tagging.
- Combined sound + sight stop signal, six dynamic warm-up cards and three cool-down cards.
- **Wheel & Helmet Safety demonstration kit:**
- 1 clean bicycle/scooter helmet fitted onto a **prop ball or large melon** (students never share headwear), showing the **expanded-polystyrene foam liner** inside and adjustable cradle/straps.
- A bicycle bell and clip-on **white front light + red rear light** (or bold printed picture cards if real lights/bell are unavailable).
- Four **Wheel Safety Scenario Cards** (Card 1: Eyebrow-high tilted helmet; Card 2: Keeping a bike helmet on while climbing the monkey bars; Card 3: Riding past a driveway with hedges and a parked car at dusk; Card 4: Passing a family walking ahead on a shared path).
- Tactile tape under court zone lines and crinkle/bell beanbags for blind or low-vision learners; water, ear defenders, quiet reset spot and clipboard.



Steps

✎ Opening (3 min)

Gather where everyone can see Court A. Point out the zones on the floor: "Today nobody is ever 'out'. In Treasure Lanes, runners look for **open space**—a wide lane where no guardian is standing—cross the Guardian Band to collect **one** beanbag from a Treasure Hoop, and bring it back to the Home Crate." Review safe **butterfly tag** from Grade 1: guardians stay strictly inside the 2.5-metre Guardian Band and tag **only** with a gentle open-hand tap on the shoulder, upper arm or upper back (or a light tap on shoulder/chair frame with a soft foam noodle—never grabbing shirts, arms or chairs). If tagged while empty-handed, simply jog/roll back to the Home Safe Zone and go straight back in; if tagged while carrying a beanbag, place the beanbag back in a Treasure Hoop, touch the Home Safe Zone, and immediately try again!

Warm-up (5 min)

Run the six dynamic warm-up cards around the outer perimeter, then spend 90 seconds practising **defensive side-slides** (knees softly bent, feet gliding without crossing—or crisp forward/reverse chair pivots) and **outside-foot plant-and-cut changes of direction** in open space so ankles and knees are primed for chasing and fleeing.

✎ Main activity (18 min)

1. **Round 1 — Spot the open lane (5 min).** Put 6–8 students per half-court (for example 5–6 runners vs. 2 guardians on Court A and Court B; if the class is larger than 18, add a third parallel strip or rotate a 2-minute coach-observer pair who spot open lanes from the side).
2. Play for 3 minutes, then pause on the stop signal and ask: "Runners, what happened when three of you ran straight at the same guardian?" (Crowded space made tagging

easy.) "Where was the **open space**?" (`S2.E1.3`: the unguarded far side of the band!) Swap guardians so everyone plays both roles.
3. **Round 2 — Chasing & fleeing tactics huddle (7 min).** Teach two explicit tactics on each side (`S2.E5.3a`, `S2.E5.3b`, `S2.E3.3`):
4. **Fleeing tactics (Runners):** (a) Scan before leaving safety—spot the widest gap first; (b) Change speed or fake-and-cut—approach at an easy pace, step one way to draw a guardian, then accelerate briskly through the open lane; (c) Team decoy/split—two teammates enter at opposite edges of the band at the same time so one guardian cannot cover both.
5. **Chasing tactics (Guardians):** (a) Zone spacing—Guardian 1 covers the left half of the band and Guardian 2 covers the right half instead of bunching together on one runner; (b) Watch the runner's waist/hips, sliding sideways smoothly rather than lunging off balance. Play two 3-minute games with a guardian swap in the middle so every student tests both chasing and fleeing tactics.
6. **Wheel & Helmet Safety hands-on huddle (6 min).** Gather seated at the centre buffer while heart rates begin to step down. Show the **prop helmet on the ball/melon** (remind students we never share helmets head-to-head):
7. **Inside the helmet:** point out the stiff **expanded-polystyrene foam liner** designed to crush and absorb impact acceleration in a fall while keeping vents open and peripheral vision clear. Point out that an unbuckled or tipped-back helmet slides off the forehead right when needed—proper fit matters enormously.
8. **Three-Point Helmet Fit Check (2-V-1 Self-Mime)** (students mime with clean fingers on their own brow, ears and chin): **2** finger-widths level above the eyebrows (protecting the forehead without blocking sight); **2** fingers forming a snug V-strap around each ear; **1–2** fingers fitting snugly between chin and buckled strap.
9. **The Playground Rule (CPSC strangulation warning):** "Helmet **ON** for wheels (bike, scooter, skates); helmet **OFF** before climbing playground frames or trees!" Explain plainly why: a helmet or strap can wedge in bars or branches and strangle a climber.
10. **Quick Scenario Sort (Cards 1–4):** hold up the white front light, red rear light and bell, and solve the 4 quick cards together:
    - Card 1 (Tilted back like a sunhat, unbuckled): Fix level 2-finger brow height + buckle snug chin strap.
    - Card 2 (Parking scooter and running onto monkey bars wearing helmet): Take helmet **off** first and clip/leave it with the scooter!
    - Card 3 (Driveway with high hedge + parked car at dusk): Dusk glare/low light is high-risk—use white front & red rear lights + bright/reflective gear, watch for car doors opening (dooring) and reversing cars, and stop at the driveway edge to Stop, Look, Listen, Think.
    - Card 4 (Approaching pedestrians on a shared path): Slow down early, ring a bell or call "Passing on your left/right, thank you!" with plenty of space.

✓ Cool-down and discussion questions (6 min)

1. **Active cool-down (3 min).** Students help stack beanbags in the crates, then walk/roll two calm perimeter laps using the three cool-down cards (slow stroll, gentle calf/hip stretches at the edge, four-count breathing).
2. **Discussion questions (3 min):**
3. "When you were a guardian in Treasure Lanes, why did splitting into left and right zones work better than both chasing the same runner?" (Answer guide: chasing one runner

together opens a huge unguarded lane for every other teammate; covering zones closes open space.)
4. "Why must you always take your bike or scooter helmet OFF before climbing on playground equipment or a tree?" (Answer guide: the helmet shell or chin strap can catch in bars or branches and cause strangulation.)
5. "What helps drivers and walkers notice a cyclist or scooter rider early, especially late in the afternoon?" (Answer guide: bright or reflective clothing, a white front light and red rear light, good positioning away from blind spots and car doors, a bell or clear voice warning, and stopping to Stop, Look, Listen, Think at driveways and crossings.)

✓ Closing check (3 min)

Call three quick rapid-check prompts; students answer with a partner in 20 seconds each: 1. Name **one fleeing tactic** you used to beat the Guardian Band (scan for an open lane, change speed, plant-and-cut fake, split wide with a teammate). 2. Mime the **three-point helmet fit check (2-V-1)** on your own brow, ears and chin. 3. Thumbs up (safe) or flat time-out T (unsafe): "Sam locks his bike and climbs the climbing frame with his helmet still buckled on." (Flat T—helmet comes **off** before playground climbing!)

Vocabulary

open space, tactic, lane, zone coverage, plant-and-cut, expanded polystyrene liner, peripheral vision, reflective

Differentiation

- **Support:** widen the court or reduce guardians from 3 to 2 so open lanes are easier to spot; allow runners up to 8 seconds inside a Treasure Hoop to plan their return path.
- **Stretch:** add a cooperative **relay pass rule**—runners may pass the beanbag underhand across the Guardian Band to a teammate who has cut into an open space on the Home side!
- **Early finishers / side observers:** act as "Space Spotters" for 90 seconds, pointing out which side of the Guardian Band opened up on a successful run.

⚠ Safety

- Guardians stay **inside** the taped 2.5-metre Guardian Band so nobody chases a runner from behind toward a wall or hoop.
- Butterfly tag only (shoulder, upper arm, upper back, or soft foam noodle tap); never dive, slide on knees, or step onto hula hoops (use flat spot markers or soft non-slip hoops if the floor is slick).
- Never pass a demonstration helmet from student head to student head.

Teacher notes

- SHAPE America Grade 3 outcomes addressed: `S2.E1.3` (recognizes open spaces in a movement context), `S2.E3.3` (combines movement concepts—direction, levels, force,

time—with skills), `S2.E5.3a` (simple strategies and tactics in chasing activities—first appears in Grade 3), `S2.E5.3b` (simple strategies in fleeing activities—first appears in Grade 3), and `S4.E6.3` (works independently and safely).
- Helmet and cycling notes follow the `Bicycle helmet`, `Cycling safety` and `Green Cross Code` sources; check your local jurisdiction's rules on child helmet laws, footpath riding, and left- vs. right-hand traffic look order.

Lesson 5: Everyday fuel cards, three-station team challenge and unit check

Unit overview - Previous: Lesson 4

Goal: Using fictional character cards, students choose plain water and everyday food combinations suited to before and after active play, rotate cooperatively through three movement stations giving specific encouragement, and complete a five-part unit check.

Length: 35 minutes (opening 3, warm-up 5, main activity 18, cool-down and discussion 6, closing check 3). Plan short follow-up slots during the week if needed so every student completes the individual check calmly without rushing.

Materials

- Cleared hall/court with 2-metre clear perimeter buffer, combined sound + sight stop signal, six dynamic warm-up cards and three cool-down cards.
- **Fictional Character Fuel & Hydration Kit** (used strictly for imaginary characters—no personal food logs, no real food tasting):
- **Character 1 — Maya (30–60 minutes before playground games):** Wants steady energy that sits comfortably in her stomach before running and rolling.
- **Character 2 — Leo (halfway through a warm afternoon of park tag):** Thirsty, warm and sweating; choosing between plain tap water and a large sweetened fizzy/energy drink.
- **Character 3 — Samira (after an hour of energetic wheelchair basketball practice):** Hungry, thirsty, and muscles worked hard.
- **Character 4 — Toby (building a colourful everyday lunchbox on a family budget):** Allergic to peanuts; wants water plus varied everyday plant or animal foods.
- **9 Food & Drink Building-Block Cards (8 everyday cards + 1 discussion card)** (words + clear drawings):
    1. Plain tap water; 2. Milk or calcium-fortified soy/oat drink;
    2. Wholegrain bread, tortilla, rice, oats or noodles (grains/starches — steady play energy); 4. Banana, apple or tinned/frozen berries (fruit — vitamins, fibre & quick natural energy); 5. Carrot sticks, cucumber, peppers or frozen peas (vegetables — vitamins, minerals, water & fibre);
    3. Beans, lentils, chickpeas or hummus (plant protein + fibre);
    4. Tofu, eggs, yoghurt/cheese, fish or chicken (protein-rich foods — growing & repairing muscles); 8. Sunflower or pumpkin seeds (nut-free crunch); plus a discussion card for Sweetened fizzy soda / caffeinated energy drink.
- **Three Cooperative Skill Stations** spaced safely in three zones of the hall with bold numbered station signs:
- **Station 1 (Hand Dribble & Partner Catch Alley):** bouncy balls + soft hand-size foam balls + cones.
- **Station 2 (Foot Dribble & Cushion-Pass Gates):** slightly deflated size 3/4 or foam balls + 4 one-metre cone gates + optional adaptive paddles.
- **Station 3 (Mini Treasure Lanes 3v1/3v2 Open-Space Lane):** 1 Home Crate, central taped Guardian Band, 2 Treasure Hoops with 8 beanbags, sashes/foam noodles.
- Raised-line food/station cards and bell balls for blind/low-vision learners; water, ear defenders, quiet reset spot, and the teacher's unit check sheet.

Steps

✎ Opening (3 min)

Introduce our four fictional characters (Maya, Leo, Samira, Toby) and display the three everyday food-and-drink jobs on a simple board chart (**never** ask who ate what for breakfast or lunch, and remind the class that every family and culture uses different delicious grains, fruits, vegetables and proteins): 1. **Plain water** replaces the water our bodies lose through sweat and breathing—best everyday choice before, during and after play (whereas sweetened sodas add lots of sugar without helping play, and caffeinated energy drinks are not for children). 2. **Grains/starches + fruit/vegetables** (such as oats, rice, flatbread, wholegrain toast, banana, apple, carrots) give steady carbohydrate energy, vitamins, minerals and fibre before and across active days. 3. **Protein-rich foods alongside carbohydrates and water** (such as beans, lentils, hummus, tofu, milk/yoghurt or fortified soy, eggs, fish or poultry) after vigorous play help refuel energy and repair/grow working muscles.

Warm-up (5 min)

Three student leaders each pick two of the six dynamic warm-up cards and lead the class smoothly from brisk march/push through joint mobility to a gentle jog and a smooth three-move transition (jog -> side-slide -> skip -> balanced freeze), checking shoelaces and perimeter spacing before stations start.

✎ Main activity (18 min)

1. **Quick Team Fuel Match (4 min).** Divide the class into small cooperative teams of 4–5. Give each team one Character Card (Maya, Leo, Samira or Toby) and a set of building-block cards. Teams take 2 minutes to pick a sensible drink + food pairing for their character and 2 minutes for a 20-second share-out per card:
2. Maya (before play): plain water + easy steady energy such as banana and wholegrain toast/oats or tortilla.
3. Leo (mid-play on a warm day): plain cool water (not fizzy/energy drink) plus a brief shade breather.
4. Samira (after vigorous wheelchair basketball): water (or milk/fortified soy drink) + a carbohydrate **and** a protein-rich food, such as rice and beans, hummus with flatbread and cucumber, or egg/chicken/tofu wrap with apple.
5. Toby (peanut-free budget lunchbox): tap water + wholegrain bread/rice + tinned/seasonal fruit & carrot/peas + beans/egg/yoghurt/sunflower seeds (safe from peanuts!).
6. **Three-Station Cooperative Challenge + Unit Checks (14 min; ~4.5 min per station with 15 s walk-transitions).** Teams rotate clockwise on the stop signal (`Station 1 -> Station 2 -> Station 3`), practising independently and giving each teammate **one specific praise cue** per station (`S4.E4.3a/b`, `S4.E6.3`):
7. **Station 1:** Dribble a bouncy ball with fingerpads and eyes up around 3 cones at a slow jog/push, then swap to a partner 3 m away for 5 accurate underhand tosses and two-hand cushioned catches (plus 3 stationary overhand throws if a wall target sits beside Station 1).
8. **Station 2:** Foot-dribble a ball around 2 cones at a gentle jog, then complete 6 inside-of-the-foot **cushion-and-pass** exchanges with a partner through a 1-metre cone gate.

9. **Station 3:** Play continuous non-elimination mini Treasure Lanes (3 runners vs. 1 or 2 guardians, swapping guardian every 90 seconds), calling out open lanes and using safe butterfly tag. While teams work at the stations, the teacher pulls pairs aside briefly at each station to record the **5-part unit check** below.

✓ Cool-down and discussion questions (6 min)

1. **Active cool-down (3 min).** Teams tidy their final station neatly in 45 seconds, then walk/roll two progressively slower laps around the hall with shoulder rolls, calf/quad/arm stretches and slow four-count breathing until heart rate and breathing feel settled.
2. **Discussion questions (3 min):**
3. "Why does pairing plain water, a grain or fruit, and a protein-rich food work so well after an hour of energetic play like Samira's?" (Answer guide: water replaces fluid lost in sweat, grains/fruit replenish carbohydrate energy, and protein-rich foods like beans, tofu, dairy, eggs or poultry help growing muscles repair and build.)
4. "Can two families eat completely different cultural dishes—say rice and lentils in one home, and tortillas with beans and peppers or wholegrain toast and eggs in another—and both give their bodies great play fuel?" (Answer guide: yes—healthy diets can be built from many plant-based and animal-based foods across every culture and budget.)
5. "Which teamwork habit kept all three stations running safely without the teacher standing right next to you?" (Answer guide: keeping balls in lanes, opening triangles so everyone got turns, using specific praise, and stopping immediately on the sound-and-sight signal.)

✓ Closing check (3 min)

Seated thumbs/partner wrap-up: each student turns to a partner and names **one movement skill** that feels smoother for them now than in Lesson 1 (for example eyes-up dribbling, cushioning an inside-foot pass, or spotting an open lane) and thanks their partner for one specific team moment today (`S5.E4.3`).

Five-part unit check and worked answer guide (about 3–4 minutes per student)

Observe Parts 1–3 seamlessly as students pass through Stations 1–3, and ask Parts 4–5 orally in pairs at the edge (continuing in short follow-up slots during the week if needed). Every physical task may be demonstrated using the student's regular mobility or adaptive equipment ("your controlled way counts").

1. **Smooth locomotor transition & warm-up/cool-down (`Outcomes 1`, `S1.E6.3`, `S3.E4.3`):**
2. Prompt: "Show me a smooth three-move transition down this short lane ending in a balanced freeze, then tell me one reason we warm up gradually before fast games and cool down afterwards."
3. Worked answer guide: Transitions smoothly without stopping dead between three patterns (e.g. jog -> side-slide -> skip -> balanced freeze, or smooth three-pattern wheelchair push sequence + stop). Explains that a gradual dynamic warm-up warms muscles, mobilises joints and raises heart rate for vigorous play, while a slow active cool-down brings heart rate and breathing smoothly back toward resting levels.

4. **Hand dribble + partner pass & catch (`Outcome 2`, `S1.E13.3`, `S1.E16.3`, `S1.E17.3`):**
5. Prompt: At Station 1, observe 10 metres of slow-jog/push hand dribbling, followed by 3 underhand partner tosses and 3 catches (plus check Lesson 2 clipboard note for 3 stationary overhand throw cues).
6. Worked answer guide: Pushes ball with fingerpads near waist height while glancing up to control body and space; steps with opposite foot (or stable seated alignment) to toss accurately to partner's chest; catches a gently tossed hand-size ball with **hands** (not trapped against chest), bending elbows to cushion.
7. **Foot dribble + cushioned inside-foot pass (`Outcome 3`, `S1.E18.3`, `S1.E19.3`):**
8. Prompt: At Station 2, observe gentle-jog foot dribbling around two cones and 3 inside-of-the-foot pass-and-receive exchanges through the cone gate.
9. Worked answer guide: Keeps ball within ~1 stride using controlled taps (or adaptive paddle/footplate control); turns the flat inside of the foot (or angled paddle) to **"give" (cushion)** on reception before sending an accurate floor pass back through the gate.
10. **Open-space tactic + wheel & helmet safety (`Outcome 4`, `S2.E1.3`, `S2.E5.3a/b`):**
11. Prompt: At Station 3, watch one runner turn and one guardian turn, then ask: "Tell me two things to check with a bike or scooter helmet—including what to do before climbing on playground equipment—and one way to stay safe at a driveway or dusk path."
12. Worked answer guide: Moves toward an unguarded open lane (or spaces out in the Guardian Band using safe butterfly tag). Names: (a) level, snug fit (~2 fingers above eyebrows, snug ear V-straps and buckled chin strap); (b) **take the helmet OFF before climbing playground equipment or trees** so straps cannot catch and strangle; and (c) at least one visibility/road habit (white front + red rear lights, bright/reflective clothes, bell/voice signal, watching for car doors/reversing cars, or Stop, Look, Listen, Think at driveways and kerbs).
13. **Before/after play fuel & social etiquette (`Outcomes 3 & 5`, `S3.E6.3`, `S4.E4.3b`):**
14. Prompt: Point to the building-block cards: "Pick a drink and snack for Samira after vigorous play and say why, and tell me how we know whether a playground joke is friendly banter or teasing that needs to stop."
15. Worked answer guide: Chooses **plain water** (or milk/fortified soy) plus a steady-energy carbohydrate (grain/fruit/veg) and a protein-rich food (beans, lentils, hummus, tofu, dairy, eggs, fish/poultry) to replace water, restore energy and help muscles recover. Explains that friendly play includes everyone gladly, whereas teasing hurts or excludes and must stop immediately—without "just joking" excuses—if someone looks uncomfortable or asks to stop.

Vocabulary

hydration, carbohydrate, protein, nutrients, replenish, station, etiquette, cooperative

Differentiation

- **Support:** pair students with a supportive buddy through all three stations; offer picture-only pointing options during Parts 4 and 5 of the unit check for emergent multilingual learners or students who prefer non-verbal choices.
- **Stretch:** invite confident students to serve as "Station Captains" who demonstrate the station's safety rule and model specific cue praise for their group.
- **Early finishers (waiting 30 seconds at a station):** practise alternating left- and right-hand fingerpad dribbles or soft left-to-right inside-foot pendulum taps in self-space.

⚠ Safety

- Keep at least 3 metres of clear floor between Stations 1, 2 and 3 so stray balls from Station 1 or 2 never roll into the running lanes of Station 3.
- Keep all nutrition questions strictly on the fictional character cards; never comment on any child's lunchbox, body size or home meals.
- Water breaks remain open throughout all three station rotations.

Teacher notes

- SHAPE America Grade 3 outcomes synthesised in this capstone lesson: `S3.E6.3` (foods beneficial before and after physical activity), `S4.E1.3`/`S4.E2.3` (personal responsibility and independent station work), `S4.E4.3a/b` (cooperation and praising peers), `S4.E6.3` (working safely with peers and equipment), and `S5.E1.3`/`S5.E4.3` (relationship between physical activity, good health and positive social interactions).

Grade 3 Health and PE: Jumping, Rope and Fitness (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 12 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check space, equipment, ropes and medical notes against your school's rules and PE guidance.
>
> Text-checked by four other agents (Gemini 3.8 Flash, Gemini 4 Carbon, GPT-6.1 Terra and Gemini 4 Argon); see Known gaps.

Back to the grade 3 year plan - Term 2. Builds on grade 3 term 1 Passing, dribbling, tactics, fuel and wheel safety by Gemini 4 Carbon (warm-up and cool-down, open space, specific praise) and grade 2 Balance, rolling and jumping (jumping and landing softly)

Big idea

We can jump forwards and upwards and land softly, join jumps into patterns, and jump with ropes: a short rope we turn ourselves and a long rope turned by a team. Jumping makes our hearts beat faster and our breathing speed up, and both slow down again when we rest. Activities like this help us become fitter, which means our bodies can do more of the things we want to do. Warming up gets us ready; cooling down helps us slow down gently. We work as a team, take every role, and tell each other exactly what they did well.

This is the second health and PE unit of the grade 3 year (term 2). Term 1 (by Gemini 4 Carbon) covered passing, dribbling, simple tactics, food as fuel and wheel safety. Term 3 (planned) moves on to striking and fielding and staying safe.

Outcomes

By the end of the unit a student can:

1. Jump forwards (horizontal) and upwards (vertical) with soft landings (bent knees, quiet feet, freeze) and join jumps into a pattern of three.
2. Turn a short rope and jump it several times in a row, and show at least one trick (skier, bell, backward or the rope-side swing), in their own way.
3. Jump a long rope turned by others, starting inside or running in and out, and take turns safely as turner, caller and jumper.
4. Say what happens to the heart and breathing during jumping and at rest, say what being fit means with one example activity, and say why we warm up and cool down.
5. Work with a group on a trick chain without being reminded, follow the rope safety rules, and give a classmate specific praise.

Prior knowledge

- From kindergarten to grade 2: the stop signal, the class warm-up, "my bubble" space, soft two-foot landings, jumping forwards and upwards on mats.
- From grade 3 term 1: warming up and cooling down, open space, giving specific encouragement.

- Earlier units in this collection did **not** teach rope skills, so many children will be beginners with ropes (see Known gaps). Some will skip with ropes already outside school; others never have.

Lessons

PE lessons are about 30 minutes (opening 3, warm-up 5, main 15, discussion 4, closing check 3). Leave a day or two between lessons. The stop signal is used in every lesson, and the class warm-up from grade 1 starts every lesson.

Lesson	Title	Main activity
1	Jump patterns and soft landings	Forward and upward jumps; pattern cards; jumping over a still rope line
2	Short rope: turn, jump and first tricks	Choosing a rope; swing-stop-jump; jumps in a row; skier, bell, backward, rope-side swing
3	Long rope: turners, callers and running in	Snake and waves; turning together; start inside; running in and out with a chant
4	Heart, breathing and a rope circuit	Noticing breathing at rest and after a circuit; cool-down; sorting fictional activity cards
5	Trick chains, real praise and a check	Group chains of three tricks; show and specific praise; one-to-one check

Materials (whole class unless noted)

- A hall or cleared indoor space (or a flat, dry outdoor area) with a non-slip floor, well away from walls, windows and lights. Cones or floor spots to mark the edge.
- About 30 floor spots or hoops, one per child, laid at least 3 metres apart (every lesson).
- The stop signal, both heard and seen: a drum or tambourine plus a raised hand or a red card with a square (every lesson).
- The six grade 1 warm-up cards (march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently) (every lesson).
- Short ropes in three lengths with coloured handles, one per child plus spares; beaded or plastic-segment ropes are easiest to see and hear (lesson 1 as flat rope lines, one per pair; lessons 2, 3, 4 and 5).
- Floor tape, stuck down, for lines that wheelchair users roll over (lesson 1; a practice line apart from the long ropes in lesson 3).
- Up to three long ropes about 5 metres long, one per adult available to turn an end (lesson 3; one for check part 3 in lesson 5), with floor tape or chalk for a jumping box, a ready spot, a waiting line and an exit side at each.
- Picture cards: "soft landing" (lessons 1 and 2); "rope turn" and a rope check card (lesson 2; rope turn also lesson 3); "long rope roles" and the jump chant card (lesson 3); "heart speed" cat strip, three station signs (lesson 4); trick cards and a "praise starters" card, one set per group (lesson 5).
- Six jump pattern cards A-F, one set per group of four plus a large set (lesson 1; one set for a station in lesson 4; one set per group in lesson 5).
- Lesson 4: six Little Hill activity cards and two label cards per group of four; a wall, wall bars or a partner for the calf stretch.
- Lesson 5: paper and a pencil per group; the check sheet.
- A class list for notes (every lesson). Water available in every lesson.
- Ear defenders and a quiet spot at the edge for children who need them (every lesson).

- For blind or low-vision children: a sighted guide partner (every lesson); beaded ropes that click on the floor; floor tape lines with a tactile edge (lesson 1); raised-line (dried glue) copies of the soft landing, pattern A-D, rope turn, roles, heart speed, trick and praise starters cards.

⚠ Safety and access

- **Space:** every child works on their own spot, at least 3 metres from the next; check before each lesson that no rope can reach a wall, window, light, radiator or another child. Hair tied back; no jewellery; pockets empty; shoes as your school allows. The floor must be dry and not slippery.
- **Ropes:** a rope is for jumping only. Ropes are never put round a neck, wrist or body, never tied to anyone or anything, never swung at a person and never pulled tight while someone is in them. Carry ropes folded in one hand. Ropes go back in the box at the end, not into pockets. On the stop signal children catch the rope, hold both handles in one hand and freeze; long-rope turners let the rope fall slack.
- **Long ropes:** an adult turns one end at first; children learn to turn big, slow circles together before turning for others. One jumper at a time in the jumping box; the waiting line is at least 2 metres behind the ready spot, never in front of or behind the rope; the ready spot, caller and adults stay outside the rope's full sweep. Use only as many long ropes as there are adults; groups are at least 3 metres apart with a clear exit side.
- **Landings:** soft, bent-knee landings are taught first and praised all unit. Nobody jumps from or onto equipment.
- **Opt-in:** every jump is an invitation. Children choose the rope, the trick and how many jumps to try, can take a turner, caller or watcher role instead, and can rest at the edge with no reason needed. Never move a child's arms or rope without asking first.
- **Medical:** check records for conditions that affect exercise or jumping (asthma, heart, joint, epilepsy, diabetes, recent injuries) and follow each child's plan; keep inhalers to hand. Some children are told by their doctor not to jump; offer arm jumps, stepping patterns and turner or caller roles with no fuss.
- **Bodies are private:** never measure, count or record anyone's heart rate, breathing, height, weight or number of jumps, and never compare. Choosing a rope length is about the rope, not about anyone's size. Noticing your heart or breathing in lesson 4 is optional and private.
- **Moving in your own way:** a child who uses a wheelchair does the rope-side swing, "turn and lift" (lesson 2), arm jumps, rolls over a stuck-down floor tape line (not a loose rope, which can snag or shift under wheels), turns a long rope or is the caller, as the child chooses with their support plan; jumpers never jump close to a chair's wheels. Blind or low-vision children use beaded ropes that click on the floor and a guide who says "jump", "go" and "next"; deaf children see a hand drop for "jump" and every instruction shown as well as said. Non-speaking children point, sign or use their communication aid. "Your own way counts" is said in every lesson.
- **Home and family:** activities outside school appear only on fictional Little Hill cards. Never ask children what they do at home, record it or set home activity charts.

Assessment

- Lessons 1-4: the teacher watches for soft landings, patterns of three jumps, turning and jumping a short rope, a trick, safe long-rope roles and following the rope rules, and notes it on a class list.
- Lesson 5: a one-to-one check with five parts and an answer guide (about 3 minutes per child), done while groups practise. Plan extra small-group or one-to-one slots in the week to finish the checks. Each part is marked yes / with help / not yet. Numbers of jumps are never part of the mark, and "own way" versions count fully.
- "Show me a jump forward and a jump up, with soft landings." (Yes: both jumps land with bent knees and a freeze; own way: arm jumps or rolling over a line.)
- "Turn your rope and jump it a few times, then show me one trick." (Yes: turns from the wrists and jumps more than once, plus a skier, bell, backward or rope-side swing; own way: rope-side swing or turn and lift.)
- "Jump the long rope, or show me how you turn it or call for a jumper." (Yes: jumps the long rope from inside or runs in and out, turns big circles together with a partner, or as caller says "go" and "jump" at the right moments. Can be marked from lesson 3 notes; otherwise use the long rope with an adult turner.)
- "What happens to your heart and breathing when you jump rope? What does being fit mean? Why do we warm up and cool down?" (Yes: they speed up and slow down again when we rest; our body can do more of what we want, with one example such as skipping, swimming or dancing; warm-up gets the body ready, cool-down lets it slow down gently.)
- "Show me what you do on the stop signal. What could you say to praise a friend's jumping?" (Yes: catches the rope, holds both handles in one hand and freezes; gives a specific sentence such as "I saw your soft landings".)

Sources

- SHAPE America, "Grade-Level Outcomes for K-12 Physical Education" (2013), read 12 November 2026; quoted exactly; the unit is not a full alignment: https://www.shapeamerica.org/wp-content/uploads/Grade-Level-Outcomes-for-K-12-Physical-Education.pdf
- S1.E3.3 (jumping and landing): "Jumps and lands in the horizontal and vertical planes using a mature pattern."
- S1.E27.3 (jumping rope): "Performs intermediate jump-rope skills (e.g., a variety of tricks, running in and out of long rope) for both long and short ropes."
- S3.E1.3b: "Identifies physical activity as a way to become healthier."
- S3.E2.3: "Engages actively in the activities of physical education class without teacher prompting."
- S3.E3.3: "Describes the concept of fitness and provides examples of physical activity to enhance fitness."
- S3.E4.3: "Recognizes the importance of warm-up and cool-down relative to vigorous physical activity."
- S4.E1.3: "Exhibits personal responsibility in teacher-directed activities."
- S4.E4.3a: "Works cooperatively with others."
- S4.E4.3b: "Praises others for their success in movement performance."
- The earlier rope outcomes (S1.E27.Ka to S1.E27.2b, such as "Jumps a long rope up to 5 times consecutively with student turners.", S1.E27.2b) and S1.E27.4 ("Creates a jump-rope routine with either a short or long rope.") are listed for context only.

- The grade 3 year plan (health and PE, term 2) and the health and PE progression by Gemini 4 Carbon.

Known gaps

- Four other agents text-checked this unit on 2026-11-12: Gemini 3.8 Flash (at d53e28a) reported no errors; Gemini 4 Carbon (at d53e28a/ccae023) reported three citation and recall errors; GPT-6.1 Terra (a bounded check of long-rope setup and wheelchair options at 7ae5531) reported safety and access wording problems. All reported items were fixed in 026c1c8 and 479930e, and Carbon and Terra re-checked those diffs (targeted diff checks, not fresh whole-unit reviews). Gemini 4 Argon (at 026c1c8 and 479930e) reported no errors. Those are text checks by AI agents, not a teacher review, classroom test or physical safety assessment.
- SHAPE America's outcomes are one US framework; other countries use other guidance. The unit quotes the outcomes but is not a full alignment.
- Earlier units in this collection (kindergarten to grade 2) did not teach the kindergarten to grade 2 rope outcomes (S1.E27.Ka to S1.E27.2b), so lessons 2 and 3 start from the basics; many classes will need more than one lesson for each.
- The grade 3 rope outcome expects intermediate skills on both ropes; a five-lesson unit gives a start, not mastery. The trick chain in lesson 5 is a small step towards the grade 4 routine outcome, which is not taught.
- S3.E1.3a (charting participation outside class) and S3.E5.3 ("Demonstrates, with teacher direction, the health-related fitness components.") are deliberately not covered, to keep home life and bodies private; the year plan's "choosing activities to try outside school" is done with fictional cards only.
- The heart and breathing explanations are simplified for eight-year-olds. Pulse counting is not taught.
- The soft-landing points, the rope check, the "front door" timing, the chant, the cat strip, the activity cards and the trick list are my own examples, not from a source; the "critical elements" of a mature jumping pattern are not listed in the outcomes document.
- Pacing is untested; long-rope work needs extra adults.
- The order of lessons, the games, the equipment list and the timings are my choice, not taken from a source.

Lesson 1: Jump patterns and soft landings

Unit overview - Next: Lesson 2

Goal: Children jump forwards (horizontal) and upwards (vertical) with soft landings, and join jumps into short patterns read from a card, then jump over a rope lying still on the floor.

Length: about 30 minutes.

Materials

- The cleared space, edge cones, and floor spots or hoops at least 3 metres apart, one per child.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- The "soft landing" picture card (bend your knees, land on the front of your feet then heels, arms help, quiet feet, freeze).
- The six jump pattern cards A-F (see step 3), one set per group of four, plus one large set for the board.
- Short ropes laid flat on the floor as still "rope lines", one per pair (or floor tape lines); stuck-down floor tape lines for any child who uses a wheelchair.
- For blind or low-vision children: a sighted guide partner; raised-line (dried glue) copies of the soft landing card and of pattern cards A-D; floor tape lines with a tactile edge (a strip of thick tape on top).
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge. "This term we are jumpers. We will jump in patterns, jump with ropes, and find out what jumping does to our hearts and our breathing." Agree the stop signal: stop, both feet still, freeze. "Your own way counts": anyone can step, roll, clap or use arm jumps instead of jumping, and anyone can rest at the edge with no reason needed.

Warm-up (5 min)

The class warm-up from grade 1, using the six cards: march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently. Add ten small "ankle bounces" on the spot (heels just off the floor) and "ankle circles" sitting down. "Jumping needs warm ankles and knees."

✎ Main activity (15 min)

1. **Soft landing (3 min).** Show the soft landing card. On their own spot, children jump straight up a little and land: knees bend, front of the feet then heels, quiet feet, freeze for "one, two". "Can you land so quietly that I can't hear you?" Try three or four times.

2. **Forward and up (3 min).** Two-foot jump forward off the spot and land (horizontal), then turn and jump back on. Then a two-foot jump up as high as feels safe (vertical). "Swing your arms back, then forward and up. Land soft and freeze."
3. **Pattern cards (6 min).** Groups of four, each child on their own spot, with a set of pattern cards. One child reads a card, everyone does it, then the next child picks a card. Cards:
4. A: jump forward, jump forward, jump up.
5. B: hop, hop (same foot), jump (two feet).
6. C: jump forward, jump back, jump up.
7. D: jump to the side, jump to the other side, jump up.
8. E: jump over the rope line, land, freeze.
9. F: make your own pattern of three jumps.

For card E, each pair shares one rope lying flat on the floor between their spots and takes turns. For card F, the group copies the child who made the pattern. 4. **Rope line (3 min).** Pairs with their flat rope line: jump over it forwards, then side to side over it ("skier"), then forward and back ("bell"). One partner watches and says "soft" or "try softer". These two jumps come back with a turning rope in lesson 2.

Children who prefer not to jump step over the line, do one-foot steps for hops, or do arm jumps (both arms up, then down, in the pattern).

✓ Discussion questions (4 min)

1. "What makes a landing soft?" (Bending the knees, landing on the front of the feet then the heels, freezing.)
2. "Which jump went far and which went high?" (A forward jump goes far: it is horizontal. A jump up goes high: it is vertical.)
3. "Why do we freeze after we land?" (So we are balanced and in control, and nobody bumps into us.)

✓ Closing check (3 min)

The teacher says three sentences; children show thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "A soft landing has bent knees." (True.)
2. "A jump up is a horizontal jump." (False: up is vertical; forward is horizontal.)
3. "Loud feet mean a soft landing." (False: soft landings are quiet.)

Vocabulary

jump, hop, land, soft landing, forward, horizontal, vertical, pattern, skier, bell, freeze

Differentiation

- **More support:** jump from a standing start only; hold a partner's hand or a wall for vertical jumps; use only cards A and C.

- **More challenge:** add a quarter turn to a jump up; make a pattern of four or five jumps for card F; land on one foot and hold still.
- **Moving in your own way:** a child who uses a wheelchair rolls forward and back over a stuck-down floor tape line (not a loose rope, which can snag or shift under wheels), chosen with the child and their support plan, or does arm jumps (arms up and down) in each pattern; a partner reads the card. Blind or low-vision children use raised-line cards and tactile tape lines with a guide who says "line".

⚠ Safety

- Spots at least 3 metres apart; arms-out check before starting.
- Ropes lie flat and still on the floor today; nobody picks them up or swings them. Check the floor is dry and not slippery.
- Jump only as high as feels safe; nobody jumps from or onto equipment.
- Counts and heights are private and never recorded or compared.

Teacher notes and misconceptions

- Many children land with straight legs and loud feet. "Land like a cat" (grade 2) or "land like frogs" (kindergarten) helps.
- "Horizontal" and "vertical" are new words for many children; link them to "flat like the floor" and "straight up like a tree".
- Some children are told by their doctor not to jump. Check records before the unit and offer arm jumps and stepping patterns with no fuss.

Lesson 2: Short rope: turn, jump and first tricks

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children turn a short rope over their head and jump it, first one turn at a time and then several turns in a row, and try one or two tricks (skier, bell, backward turn).

Length: about 30 minutes.

Materials

- The cleared space, edge cones, and floor spots or hoops at least 3 metres apart, one per child.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- The "soft landing" picture card from lesson 1.
- Short ropes in three lengths with coloured handles (for example blue short, green medium, red long), one per child plus spares; beaded or plastic-segment ropes are easiest to see and hear.
- The "rope turn" picture card: rope behind your heels; hands by your hips; small circles with your wrists; jump when the rope is near your toes.
- A rope check card (stand on the middle of the rope with both feet; the handles should reach about the middle of your chest; if not, try another colour).
- For blind or low-vision children: a sighted guide partner; a beaded rope that clicks on the floor; raised-line copy of the rope turn card.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge. Show a short rope. "Today the rope moves. A rope is for jumping only: never around anyone's neck or body, never tied to anyone, and never swung at a person." Agree the stop signal: stop, catch the rope, hold both handles in one hand, freeze. "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1 (six cards), then the lesson 1 ankle bounces and wrist circles ("rope turning comes from the wrists").

✎ Main activity (15 min)

1. **Choose a rope (2 min).** Each child takes a rope, goes to their spot and does the rope check card: stand on the middle, lift the handles. If the handles are much higher or lower than the middle of the chest, swap for another colour. Choosing a rope is about the rope, not about anyone's size; nobody comments on who has which colour.
2. **Swing and stop (3 min).** Rope behind the heels. Swing it over the head and stop it on the floor in front of the toes, then step over it. Then swing over and jump over it when it stops ("swing, stop, jump").
3. **Turn and jump (5 min).** Now swing and jump without stopping, one turn at a time with a small bounce in between if needed. Then try two or three turns in a row. Show the rope turn card: hands by the hips, small wrist circles, small jumps. Children count their own jumps in a row quietly and try to beat their own best; numbers are not said out loud or written down.
4. **First tricks (5 min).** Children choose one or two:
5. **Skier:** jump the turning rope landing a little to one side, then the other (like lesson 1's rope line).
6. **Bell:** jump the turning rope landing a little forward, then back.
7. **Backward:** start with the rope in front of the toes and swing it backward over the head.
8. **Rope-side swing:** hold both handles in one hand and swing the rope beside the body, jumping each time it hits the floor (no rope to trip over; good for anyone still learning).

Children who prefer not to jump can do the rope-side swing without jumping, or step over a still rope.

✓ Discussion questions (4 min)

1. "Where does the turning come from?" (Mostly the wrists, with hands down by the hips.)
2. "When do you jump?" (When the rope is about to reach your toes.)
3. "What did you do when the rope caught your feet?" (Stopped, set the rope behind the heels, and started again. That happens to everyone.)

✓ Closing check (3 min)

Thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "We turn a short rope mostly with our wrists." (True.)
2. "It's fine to put a rope round a friend's neck as a game." (False: never round anyone's neck or body.)
3. "On the stop signal we keep turning the rope." (False: catch it, hold both handles in one hand and freeze.)

Vocabulary

short rope, handles, turn, wrists, in a row, skier, bell, backward, trick

Differentiation

- **More support:** swing-stop-jump only; use the rope-side swing; a longer rope (it turns more slowly); a partner says "jump" each time.
- **More challenge:** skier and bell in a row; backward turns in a row; jogging on the spot while turning (one foot then the other).
- **Moving in your own way:** a child who uses a wheelchair does the rope-side swing from their chair, or holds both handles and swings the rope over the head and down in front of the footrests, then lifts it back ("turn and lift"); a partner can count. Blind or low-vision children use a beaded rope and listen for the click on the floor; a guide claps when the rope lands. Deaf children see the guide's hand drop for "jump".

⚠ Safety

- Spots at least 3 metres apart; arms-out check with the rope held in both hands at full stretch before starting.
- Ropes are never put round a neck or body, never tied to anyone or to anything, and never swung at a person. Ropes go back in the box at the end, not into pockets.
- Children who walk between spots carry the rope folded in one hand.
- Counts are private and never recorded or compared.

Teacher notes and misconceptions

- Most beginners turn with big arm circles and jump too high. "Hands by your pockets" and "small bunny jumps" help.
- Some children jump too early, before the rope arrives. Swing-stop-jump helps them see where it lands.
- Earlier units in this collection did not teach rope skills (see Known gaps), so many children are beginners here. That is expected.

Lesson 3: Long rope: turners, callers and running in

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children turn a long rope together with a partner, jump a long rope several times in a row, and try running in and out of a turning long rope; they take turns as turner, caller and jumper.

Length: about 30 minutes.

Materials

- The cleared space and edge cones; floor spots at least 3 metres apart for the short-rope area.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- Long ropes about 5 metres long, up to three (one per long-rope group, and only as many as there are adults to turn one end), with floor tape or chalk marking a "jumping box" under the middle of each rope, a "ready spot" beside one turner and outside the rope's full sweep (where the next jumper stands), a waiting line about 2 metres behind the ready spot, and an exit side.
- The short ropes from lesson 2, one per child in the short-rope half.
- A stuck-down floor tape line set apart from the long-rope areas, for hand-held practice.
- The "rope turn" card from lesson 2 and a "long rope roles" card: turner (big circles from the shoulder, rope just brushes the floor, watch the jumper), caller (says "go" when the rope hits the floor, and the count), jumper (in, jump, out), waiting line (behind the ready spot).
- The jump chant written on a large card: "Rope goes down, in I go. Jump, jump, out I go." (an original chant written for this unit).
- For blind or low-vision children: a sighted guide partner; a beaded long rope that clicks on the floor; raised-line copy of the roles card.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge. Show a long rope. "A long rope needs a team: two turners, a caller and a jumper. Everybody can try every job, you choose your jobs, and every job counts." Read the roles card together. Agree the stop signal: turners let the rope fall to the floor and everyone freezes. "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1 (six cards), then big slow arm circles ("turner arms") and the ankle bounces from lesson 1.

✎ Main activity (15 min)

The class splits into two halves. After step 1, one half works at the long ropes (groups of about five; each rope needs an adult at one end at first, so with fewer adults use fewer ropes and swap groups more often) while the other half practises short-rope tricks from lesson 2 on their spots. In step 3 the halves swap, so everyone does the same long-rope work.

1. **Snake and waves (3 min, whole class, in turn at the long ropes).** Turners hold the long rope on the floor and wiggle it side to side ("snake") or make small waves. Jumpers jump over it without touching it, one at a time, from the ready spot to the exit side.
2. **Long rope, first half (6 min).**
3. Start inside (3 min). An adult turns one end with a child at the other at first. Turners stand facing each other, rope just touching the floor in the middle, and turn big circles from the shoulder together. A jumper stands in the jumping box beside the still rope; the turners start turning and the caller says "jump" each time the rope reaches the jumper's feet. Jump up to five times in a row, then run out to the exit side when the turners stop. Swap roles after every one or two jumpers.
4. Running in (3 min). The turners turn so the rope comes over the top towards the jumper and hits the floor in front of the jumper ("front door"). The jumper stands on the ready spot, beside a turner. When the rope hits the floor, the caller says "go" and the jumper runs into the jumping box, jumps when the rope comes round, then runs out the exit side. The group says the chant: "Rope goes down, in I go. Jump, jump, out I go."

Meanwhile the second half practises short-rope tricks on their spots. 3. **Long rope, second half (6 min).** Swap halves and repeat step 2: start inside, then running in. The first half now practises short-rope tricks.

Anyone who prefers not to run in can start inside every time, or be a turner or caller. Running in is an invitation, never required.

✓ Discussion questions (4 min)

1. "What does a good turner do?" (Turns big circles together with the other turner, lets the rope brush the floor, watches the jumper and stops the rope if the jumper gets caught.)
2. "When is the best time to run in?" (Just after the rope hits the floor, when the caller says "go".)
3. "How did your team help each other?" (Answers will vary: for example, the caller counted, turners slowed down, someone said "nice try".)

✓ Closing check (3 min)

Thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "Turners turn the rope together." (True.)
2. "The waiting line stands right next to the turning rope." (False: wait behind the ready spot, out of the rope's way.)

3. "If the jumper is caught, turners keep turning hard." (False: let the rope go slack or stop it.)

Vocabulary

long rope, turner, caller, jumper, run in, run out, front door, together, team

Differentiation

- **More support:** start inside only; turners turn slowly; the jumper practises at a stuck-down tape line set apart from the long-rope areas, jumping over it while holding an adult's hand, before trying the snake alone; with a turning rope, the adult stands outside the rope's sweep and says "jump".
- **More challenge:** run in, jump five times and run out; run in, jump and turn round once; run in on the caller's "go" without a wait.
- **Moving in your own way:** a child who uses a wheelchair can choose to turn the rope (a lighter rope, with an adult turning the other end), be the caller, or do arm jumps level with a turner, outside the rope's sweep, as the rope lands; jumpers never jump near the chair's wheels. Blind or low-vision children listen for the beaded rope's click with a guide who says "go" and "jump"; deaf children watch the caller's hand drop.

⚠ Safety

- The waiting line is at least 2 metres behind the ready spot, never in front of or behind the rope. Only one jumper at a time in the jumping box.
- The ready spot, waiting line, caller and anyone doing arm jumps stay outside the rope's full sweep. Adults turning or helping stay at the rope ends, never in the jumping box.
- Turners never pull the rope tight or whip it; if the jumper is caught, the turners let the rope go slack. Never wrap a rope round a hand, wrist, neck or body, and never tie a rope to a person.
- Long-rope areas at least 3 metres from walls, from the short-rope spots and from each other, each with a clear exit side that leads away from the other groups.
- Counts are private and never recorded or compared.

Teacher notes and misconceptions

- New turners often turn too fast or too high. "Brush the floor, big slow circles" and an adult at one end help a lot.
- Many children run in too late or stop in the middle to look at the rope. The caller's "go" and the chant give the rhythm.
- The "front door" description and the chant are my own teaching points, not from a source.
- Being a good turner is a real skill; praise turners as much as jumpers.
- With fewer long ropes, each child gets fewer turns in six minutes. Give the long-rope steps more time, or continue them in another lesson, rather than rushing the rotation.

Lesson 4: Heart, breathing and a rope circuit

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children notice that breathing and the heart speed up during jumping activity and slow down when resting, explain why we warm up and cool down, and sort fictional activity cards into activities that make the heart beat faster and resting activities.

Length: about 30 minutes.

Materials

- The cleared space, edge cones, and floor spots or hoops at least 3 metres apart, one per child.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- The short ropes from lesson 2, one per child at the rope station.
- The jump pattern cards A-F from lesson 1, one set for the pattern station.
- Three station signs with pictures: "Short rope", "Jump patterns", "Skier jog" (jogging on the spot with small side-to-side steps).
- The "heart speed" picture strip: a cat asleep (slow), a cat walking (medium), a cat running (fast); one large copy for the board.
- The six Little Hill activity cards (see step 4), one set per group of four, and two label cards per group: "Heart beats faster" and "Heart stays slow (resting)".
- A wall, wall bars or a partner to hold for the calf stretch.
- For blind or low-vision children: a sighted guide partner; a beaded rope; raised-line copies of the heart speed strip, with the activity cards read aloud by a partner.
- Water (offer it after the circuit).
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge. "Today we are scientists of our own bodies, but only inside our heads: nobody measures anyone, and nobody has to tell anyone what they notice." Show the heart speed strip. "Your heart pumps blood round your body all the time. When you are resting it is like the sleeping cat. Let's find out what happens when we jump." Agree the stop signal. "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1 (six cards) and the lesson 1 ankle bounces. Ask: "Why do we warm up before jumping?" (It gets the body ready: the heart speeds up a little, muscles get warm, so jumping is easier and we are less likely to get hurt.)

✎ Main activity (15 min)

1. **Resting check (2 min).** Everyone sits still on their spot for about 30 seconds and notices their breathing. Anyone who wants to can put a hand flat on their chest. "Which cat is your heart like now? Think it, don't say it." Nobody counts beats out loud, writes anything down or shares.
2. **Rope circuit (6 min).** Three stations, about 2 minutes each, moving on at the stop signal: short rope (turn and jump, or a trick from lesson 2), jump patterns (pattern cards), skier jog. Children work at their own pace and can walk instead of jog. Then the stop signal and a quick check: "Which cat is your heart like now?" (Think it, don't say it.) Offer water.
3. **Cool-down (3 min).** Walk slowly round the edge of the space, then big slow breaths (breathe in as arms go up, out as arms come down), then a gentle calf stretch holding the wall or a partner, and a reach up tall. "Notice your breathing slowing back down, like the cat getting sleepy."
4. **Activity card sort (4 min).** Groups of four sort the six Little Hill cards under the two label cards:
5. A: Leo skips with a rope in the park.
6. B: Remy reads a comic on a bench.
7. C: Sana dances to music in the kitchen.
8. D: Mo plays a board game with a friend.
9. E: Kit swims in the pool.
10. F: Ana walks fast up the hill to the library.

Answers: heart beats faster: A, C, E, F. Heart stays slow (resting): B, D. "Both kinds are good for us: active play makes our hearts and muscles stronger, and rest helps our bodies recover." Then: "Which card would you like to try one day? Choose in your head; you don't have to say."

✓ Discussion questions (4 min)

1. "What happened to your breathing during the circuit?" (It got faster; for many people the heart got faster too, like the running cat.)
2. "Why do our heart and breathing speed up when we jump?" (Our muscles are working hard and need more air and blood, so the heart pumps faster and we breathe faster.)
3. "What does being fit mean?" (Our body can do the things we want to do, like playing, jumping and running for longer without getting too tired. Jumping rope, swimming, dancing and fast walking help.)
4. "Why do we cool down?" (To let the heart and breathing slow down gently, and to stretch muscles that have worked hard.)

✓ Closing check (3 min)

Thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "Jumping rope makes the heart beat faster." (True.)
2. "Reading a comic makes the heart beat as fast as swimming." (False: reading is resting; swimming is active.)

3. "We cool down after jumping to let the heart slow down gently." (True.)

Vocabulary

heart, beat, breathing, faster, slower, resting, active, fit, fitness, warm-up, cool-down, stretch

Differentiation

- **More support:** use only the cat pictures (point or think); sort only cards A and B first; walk instead of jog at the skier station.
- **More challenge:** suggest one more Little Hill card for each label; explain why warming up helps before jumping, not just after.
- **Moving in your own way:** a child who uses a wheelchair does arm pushes, arm jumps or the rope-side swing at each station and pushes slowly round the edge for the cool-down; the calf stretch becomes a shoulder and arm stretch. Blind or low-vision children use the raised-line strip and a partner reads the cards aloud. Children who prefer not to notice their heart can notice only their breathing, or simply rest.

⚠ Safety

- Never measure, count or record anyone's heart rate, breathing or body, and never compare. Noticing is private and optional.
- Children with asthma or heart conditions follow their own plan, keep inhalers to hand and can do the circuit at walking pace or rest.
- Spots at least 3 metres apart; ropes are never put round a neck or body, never tied to anyone.
- Activity cards show made-up children only. Do not ask what children do at home or outside school.

Teacher notes and misconceptions

- Some children think a fast heart is "bad" or frightening. Explain that a heart speeding up during play is normal and healthy, and it slows down again when we rest. A child who feels unwell (dizzy, chest pain, struggling to breathe) stops and tells an adult straight away.
- Some think resting is "lazy". Both activity and rest are part of being healthy.
- The cat strip and the activity cards are my own examples, not from a source.

Lesson 5: Trick chains, real praise and a check

Unit overview - Previous: Lesson 4

Goal: Groups plan, practise and show a short chain of three rope or jump tricks, give each other specific praise, and each child does a short one-to-one check.

Length: about 30 minutes (one-to-one checks continue in other slots).

Materials

- The cleared space, edge cones, and floor spots or hoops at least 3 metres apart, one per child.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- The short ropes from lesson 2, one per child.
- The jump pattern cards A-F from lesson 1, one set per group of four.
- Trick cards, one set per group of four: basic turn and jump; skier; bell; backward; rope-side swing; jog on the spot while turning.
- A "praise starters" card: "I saw your ...", "Your ... was really ...", "You kept going when ...".
- Paper and a pencil per group (to write or draw the trick chain).
- One long rope with its jumping box, ready spot and waiting line from lesson 3, for check part 3 if needed (an adult turns one end, a child volunteer the other).
- The check sheet (see Assessment in the unit overview) and a class list for notes.
- For blind or low-vision children: a sighted guide partner; a beaded rope; raised-line copies of the trick cards and the praise starters card.
- Water.
- Ear defenders and a quiet spot at the edge for children who need them.

Steps

✎ Opening (3 min)

Sitting at the edge. "Today your group makes a trick chain: three tricks, one after the other. Then you show another group, and they tell you what they really saw you do well." Read the praise starters card together. Agree the stop signal: catch the rope, hold both handles in one hand, freeze. "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1 (six cards), ankle bounces and wrist circles. Ask one child to say why we warm up (to get the heart and muscles ready).

✎ Main activity (15 min)

The teacher starts one-to-one checks during step 2 (about 3 minutes per child); another adult supervises the groups. Plan extra slots in the week to finish the checks.

1. **Plan a chain (3 min).** Each group chooses three tricks from the trick cards or pattern cards (for example: basic turn and jump, skier, bell) and writes or draws them in order on their paper. Every member can choose their own way of doing each trick (for example the rope-side swing instead of jumping).
2. **Practise (6 min).** Each child practises the chain on their own spot, with their own rope. Group members help each other remember the order and say "next" between tricks.
3. **Show and praise (6 min).** Two groups pair up. Group 1 shows its chain (everyone at once, each on their own spot) while group 2 watches; then swap. Each watcher gives one piece of specific praise using a starter: "I saw your soft landings", "Your skier was really neat", "You kept going when the rope caught". The performer says "thank you".

✓ Discussion questions (4 min)

1. "What makes praise helpful?" (It says exactly what was good, so the person knows what to keep doing.)
2. "How did your group decide on its chain?" (Answers will vary: for example, everyone suggested one trick, or we took turns choosing.)
3. "What is one thing your body can do now that it could not do at the start of the unit?" (Answers will vary; only share if you want to.)

✓ Closing check (3 min)

Thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "'I saw you land softly every time' is specific praise." (True.)
2. "'Good' is the most helpful praise we can give." (False: saying exactly what was good helps more.)
3. "We put ropes back in the box at the end, not in pockets." (True.)

Vocabulary

trick, chain, order, praise, specific, perform, watch, practise

Differentiation

- **More support:** a chain of two tricks; the rope-side swing; a partner says "next" and shows the next card.
- **More challenge:** a chain of four tricks; add a turn or a backward trick; move into a long rope with an adult turner if one is free.
- **Moving in your own way:** a child who uses a wheelchair does the rope-side swing, "turn and lift" (from lesson 2) or arm jumps in the chain. Blind or low-vision children use raised-

line trick cards with a guide who says "next". Non-speaking children give praise by pointing to a starter and showing, signing or using their communication aid.

⚠ Safety

- Spots at least 3 metres apart; groups that are watching stand at the edge of the performing group's area, never inside it.
- Ropes are never put round a neck or body, never tied to anyone, and go back in the box at the end.
- Counts are private; checks never record numbers of jumps.
- Praise is about what someone did, never about their body.

Teacher notes and misconceptions

- Children often give general praise ("good", "nice"). Model one specific sentence first and ask the class what made it specific.
- Some children find being watched hard. Every group member performs together, and a child can be the "next" caller instead of performing.
- Making a full jump-rope routine is a grade 4 outcome in SHAPE America's document; this chain of three tricks is a smaller first step (see Known gaps).

Grade 3 Health and PE: Striking, Fielding and Staying Safe (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 12 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check space, equipment, sun and water guidance and medical notes against your school's rules and PE guidance.
>
> Text-checked by four other agents (Gemini 3.8 Flash, Gemini 3.5 Flash, Gemini 4 Argon and Gemini 4 Carbon); see Known gaps.

Back to the grade 3 year plan - Term 3. Builds on grade 2 Hitting and passing (bat grip, side-on stance, batting box and waiting line), grade 2 Healthy habits and a class game day (water, sun and heat) and grade 3 term 2 Jumping, rope and fitness (warm-up, cool-down, specific praise)

Big idea

We can strike a ball off a tee with a bat and send it forward into space, and we can field: watch the ball, get our body behind it, catch or stop it, and send it back with an underhand throw to a target. Striking and fielding games need clear places to stand, fair turns for everyone and rules that keep us safe. On a sports day outside we also look after ourselves: shade, a hat and water in the sun, and staying well back from ponds, rivers and pools, where only adults go in.

This is the third health and PE unit of the grade 3 year (term 3). Term 1 (by Gemini 4 Carbon) covered passing, dribbling, simple tactics, food as fuel and wheel safety; term 2 covered jumping, rope skills and fitness.

Outcomes

By the end of the unit a student can:

1. Strike a soft ball off a tee with a light bat, holding the bat with both hands together and standing side-on, sending it forward.
2. Catch a gently tossed soft ball from a partner, with hands ready, eyes on the ball and "soft hands" that give as the ball arrives.
3. Throw underhand to a partner or a target (a hoop or a "stopper" in a hoop) with reasonable accuracy, and stop a rolling ball by getting in line with it.
4. Choose where to hit (into a space away from fielders) and, as a fielder, where to stand and where to send the ball, in a small game with fair turns.
5. Follow the striking and fielding rules (bat down in the box, waiting line, fielding line, "ready" call), say why the rules matter and praise a team-mate's play.
6. Say two ways to stay safe in the sun on a sports day and what to do if a ball (or anything else) goes into water: stay back and tell an adult.

Prior knowledge

- From grade 2: bat grip (hands together, knuckles lined up), side-on stance, batting box, safety circle and waiting line; putting the bat down, never throwing it; drinking water, shade and hats on a game day.

- From grade 1: underhand throwing and catching with a partner.
- From grade 3 terms 1 and 2: the class warm-up and cool-down, open space, specific praise.
- Running round a cone and back is new as part of a game; earlier units in this collection did not play a striking and fielding game with runs.

Lessons

PE lessons are about 30 minutes (opening 3, warm-up 5, main 15, discussion 4, closing check 3). Leave a day or two between lessons. The stop signal is used in every lesson, and the class warm-up from grade 1 starts every lesson.

Lesson	Title	Main activity
1	Batting into space	Grip and side-on stance again; striking off a tee to a target zone; bat down in the box
2	Fielding: ready, stop, catch	Ready position; stopping a rolling ball; catching a gentle toss with soft hands
3	Throwing to the stopper	Underhand throws to a hoop and a stopper; a fielding relay back to the hoop
4	Tee and Cone: a game with fair turns	Small-group striking and fielding game with runs, a rotation card and class rules
5	Little Hill sports day: sun, water and a check	Sports day cards about sun and water; a short game; one-to-one check

Materials (whole class unless noted)

- A flat, dry field or playground with shade nearby (or a large hall for lessons 1-3 and a single game in lesson 4), well away from roads, ponds, windows and other classes. Cones or floor spots to mark the edge.
- About 30 floor spots or hoops, one per child (every lesson).
- The stop signal, both heard and seen: a drum or tambourine plus a raised hand or a red card with a square (every lesson).
- The six grade 1 warm-up cards (every lesson).
- Batting tees or tall cones, one per group of five or six (lessons 1, 4 and 5); light foam or plastic bats with a wide barrel, one per tee, plus shorter, lighter spares; large soft foam balls (about the size of a grapefruit), six per tee; a collecting bucket per tee.
- Floor tape or chalk and cones to mark, at each tee: a batting box with a hoop on the ground for the bat, a safety circle about 2 metres across, a waiting line at least 4 metres behind the safety circle, and a fielding line of cones in an arc at least 8 metres in front of the tee (lessons 1, 4 and 5).
- Soft foam or fabric balls about the size of a tennis ball, one per pair, a few larger soft balls, and beanbags, one per pair (lessons 2 and 3; and lessons 4 and 5 for children who choose them).
- Hoops lying on the ground as throwing targets, one per pair (lesson 3) and one "stop hoop" per game (lessons 3, 4 and 5); three coloured target zones (cones or chalk) in front of each tee (lesson 1).
- One cone per group to mark the rolling spot (lesson 3).
- Two cones per game for the run: a "home cone" just outside the safety circle and a "run cone" 6 metres away to the side (lessons 4 and 5).
- Picture cards, with words the teacher reads aloud: "bat grip" and "side-on" (from grade 2; lessons 1 and 5); "bat down" (lessons 1, 4 and 5); "ready position" (lessons 2, 3 and 5);

"soft hands" (lessons 2 and 5); "step and swing" underhand throw (lessons 3 and 5); the Tee and Cone layout card, rotation card and "class rules" card (lessons 4 and 5); four Little Hill sports day cards (lesson 5); "praise starters" (from term 2; lessons 4 and 5).
- A green "collect" card (green with a circle), as in grade 2 (lessons 1, 4 and 5).
- Lesson 4: a large sheet of paper and a marker for the class rules.
- Lesson 5: the check sheet and a pencil for the teacher; a spare tee or tall cone with a light bat, two large soft foam balls, soft balls, beanbags and a spare hoop for the check.
- A class list for notes (every lesson). Water to drink in every lesson, and a shaded spot and hats for every outdoor lesson.
- For children who use a wheelchair, if they choose: a lap tray and a grabber tool (lessons 2-5).
- Ear defenders and a quiet spot at the edge for children who need them (every lesson).
- For blind or low-vision children: a sighted guide partner (every lesson); bright, high-contrast balls and audible balls with a bell inside (lessons 1-5); a tee with a tactile marker on top; a small bell or a clapping partner as a sound target (lesson 3); raised-line (dried glue) copies of the bat grip, side-on, ready position, soft hands, step and swing, layout and sports day cards.

⚠ Safety and access

- **Space:** tees stand in one line, all facing the same way, so every ball is struck in the same direction and never towards another group. Leave at least 20 metres between tees outdoors; indoors, run only one or two games and keep other groups at a throwing station behind the tees. Put every run cone on the same side and every stop hoop on the other side. One adult watches each game, or each pair of games if they are side by side.
- **Bats:** only the batter holds a bat, only inside the batting box, and only swings when the stopper has called "ready". After a hit the bat is put down in the hoop in the box (never thrown, dropped while running or swung while walking). Before swinging, the batter looks round: "Is anyone in my circle?" Nobody stands beside or behind a batter inside the safety circle.
- **Waiting and fielding:** the waiting line is at least 4 metres behind the safety circle. Fielders stand behind the fielding line (at least 8 metres in front of the tee) until the ball is hit, then move. The next batter steps into the box only when every fielder is back behind the fielding line and the stopper calls "ready".
- **Balls:** only soft foam or fabric balls are used. Throws are underhand and gentle, to a person who is looking and has said "ready" or to a hoop on the ground. Fielders call "mine" before going for a ball, so two children do not run into each other.
- **Running:** the batter runs round the run cone and back, on the side away from the fielders and the stop hoop. Nobody stands on the running path. Walking or wheeling the run counts the same as running.
- **Sun and heat (outdoor lessons):** hats, shade breaks, and water before, during and after. Sunscreen follows your school's policy and families' wishes; adults never put sunscreen on a child without agreement. Never look at the Sun, even to find a high ball. Anyone who feels dizzy, sick or has a headache tells an adult, rests in the shade and drinks water.
- **Water:** never teach this unit next to open water without a fence and extra adults. In lesson 5 water safety is talked about with picture cards only; nobody goes near water. Never ask who can or cannot swim, and never ask about frightening things that have

happened near water. The sports day cards are about made-up Little Hill characters; any child can step away from the talk with no reason needed.
- **Opt-in:** every task is an invitation. Children choose the bat, ball size and tee height, can be stopper, fielder or counter instead of batter, and can rest at the edge with no reason needed. Never move a child's arms or bat without asking first.
- **Medical:** check records for conditions that affect exercise, heat or sun (asthma, heart, epilepsy, diabetes, skin or eye conditions, recent injuries, medicines that make skin sun-sensitive) and follow each child's plan; keep inhalers to hand.
- **Moving in your own way:** a child who uses a wheelchair bats from the chair off a tee raised to the right height, side-on to the tee if the chair allows, and wheels or is pushed on the run (on a firm, flat path; the run cone can be closer); fields with a partner who rolls balls to them or uses a grabber tool or a lap tray, as the child chooses with their support plan. Blind or low-vision children use audible balls, a tee with a tactile marker, and a guide who says "ball coming", "left", "right" and "home"; they may bat with the guide placing their hand on the ball first. Deaf children see every call as a sign or gesture as well as said: "ready" (thumbs up), "stop" (red card), "mine" (hand on chest). Non-speaking children point, sign or use their communication aid. "Your own way counts" is said in every lesson.
- **Scores and bodies:** runs are counted for the team, never for one child, and a game can be played with no score at all. Never record or compare how far anyone hits or throws.

Assessment

- Lessons 1-4: the teacher watches for grip and side-on stance, forward hits, ready position, stopping and catching, underhand throws to a target, choosing where to hit and following the rules, and notes it on a class list.
- Lesson 5: a one-to-one check with six parts and an answer guide (about 3 minutes per child), done while groups play. Plan extra small-group or one-to-one slots in the week to finish the checks. Each part is marked yes / with help / not yet. How far a ball goes is never part of the mark, and "own way" versions count fully.
- "Show me how you hold the bat and stand, then hit the ball off the tee." (Yes: hands together, side-on, the ball goes forward; own way: batting from a chair, a lower or higher tee, a bigger ball.)
- "Show me your ready position. Now catch this gentle throw." (Yes: knees bent, hands out and ready, eyes on the ball; catches with hands that give, or traps it against the body; own way: a lap tray or a roll.)
- "Throw underhand into the hoop." (Yes: faces the hoop, swings the arm back and forward, steps with the opposite foot and the ball lands in or near the hoop; own way: a roll or a beanbag.)
- "Where would you hit the ball in Tee and Cone, and why? If you are a fielder, where do you send the ball?" (Yes: into a space away from the fielders, so it is harder to reach; to the stopper in the stop hoop.)
- "Tell me two rules for batting and one way to make turns fair." (Yes: two of bat down in the hoop, swing only after "ready", wait behind the waiting line, stay behind the fielding line until the hit; fair turns such as three hits each, the rotation card or everyone tries every job.)
- "Tell me two ways to stay safe in the sun on sports day. What do you do if the ball rolls into a pond?" (Yes: two of hat, shade, drinking water, sunscreen as school and family agree,

telling an adult if you feel dizzy; stay back from the water and tell an adult; never go in after it.)

Sources

- SHAPE America, "Grade-Level Outcomes for K-12 Physical Education" (2013), read 12 November 2026; quoted exactly; the unit is not a full alignment: https://www.shapeamerica.org/wp-content/uploads/Grade-Level-Outcomes-for-K-12-Physical-Education.pdf
- S1.E13.3 (underhand throw): "Throws underhand to a partner or target with reasonable accuracy."
- S1.E16.3 (catching): "Catches a gently tossed hand-size ball from a partner, demonstrating 4 of the 5 critical elements of a mature pattern."
- S1.E25.3 (striking, long implement): "Strikes a ball with a long-handled implement (e.g., hockey stick, bat, golf club), sending it forward, while using proper grip for the implement. Note: Use batting tee or ball tossed by teacher for batting."
- S2.E3.3: "Combines movement concepts (direction, levels, force, time) with skills, as directed by the teacher."
- S4.E3.3: "Accepts and implements specific corrective feedback from the teacher."
- S4.E4.3a: "Works cooperatively with others."
- S4.E4.3b: "Praises others for their success in movement performance."
- S4.E5.3: "Recognizes the role of rules and etiquette in physical activity with peers."
- S4.E6.3: "Works independently and safely in physical activity settings."
- S1.E14.3 (overhand throw: "Throws overhand, demonstrating 3 of the 5 critical elements of a mature pattern, in nondynamic environments (closed skills), for distance and/or force.") and S1.E24.3a (striking with a short implement: "Strikes an object with a short-handled implement, sending it forward over a low net or to a wall.") are listed for context only; they are not taught here.
- Wikipedia, "Rounders" (read 12 November 2026), for the idea of a batting and fielding game with runs round bases: https://en.wikipedia.org/wiki/Rounders
- "Rounders is a batting and fielding team game ..." and "Gameplay centres on a number of innings, in which teams alternate at batting and fielding." Tee and Cone is a much simpler class game of my own, not rounders or baseball.
- Wikipedia, "Tee-ball" (read 12 November 2026): https://en.wikipedia.org/wiki/Tee-ball
- Tee-ball "is intended as an introduction for children to develop bat-and-ball game skills and have fun", with the ball placed on an adjustable tee.
- Wikipedia, "Sunburn" (read 12 November 2026): https://en.wikipedia.org/wiki/Sunburn
- "Sun protective measures like sunscreen and sun protective clothing are widely accepted to prevent sunburn and some types of skin cancer." It adds that children are especially susceptible to sunburn.
- Wikipedia, "Heat illness" (read 12 November 2026): https://en.wikipedia.org/wiki/Heat_illness
- Prevention includes gradual adjustment to heat and sufficient fluids; very young children are at higher risk; symptoms may include headache, nausea and dizziness; treatment includes removing the person from the heat and replenishing fluids.
- Wikipedia, "Drowning" (read 12 November 2026): https://en.wikipedia.org/wiki/Drowning
- Steps to prevent drowning include "teaching children and adults to swim and to recognise unsafe water conditions, never swimming alone, ... limiting or removing access to water (such as with fencing of swimming pools), and exercising appropriate supervision."

- "A human rescue by swimming carries a risk for the rescuer, who could be drowned trying it." This is why the unit teaches children to stay out and call an adult; the word "drowned" is not used with children.
- The grade 3 year plan (health and PE, term 3) and the health and PE progression by Gemini 4 Carbon.

Known gaps and cautions

- Four other agents text-checked this unit on 2026-11-12 at b2a4766: Gemini 3.8 Flash, Gemini 3.5 Flash and Gemini 4 Argon reported no errors (Gemini 3.5 Flash's summary first described 45-minute lessons; the lessons are 30 minutes). Gemini 4 Carbon reported one quote error, materials gaps and a lesson 5 question that assumed a sunny day; all were fixed in 2ea17d8, and Gemini 4 Carbon re-checked the fixes. Those are text checks by AI agents, not a teacher review, classroom test or physical safety assessment.
- SHAPE America's outcomes are one US framework; other countries use other guidance. The unit quotes the outcomes but is not a full alignment. The "critical elements" of mature catching and throwing patterns are not listed in the outcomes document; the cue cards are my own simplified versions.
- SHAPE's outcomes are physical education outcomes. No health education standard was read for this unit; the sun, heat and water content rests on the general sources above and needs a check against your school's health guidance and local water-safety advice.
- This is not a swimming or water-rescue unit. It teaches only "stay back and tell an adult". Swimming lessons, if your school offers them, need qualified staff and their own guidance.
- Overhand throwing (S1.E14.3) and striking with a short implement over a net (S1.E24.3a) are grade 3 outcomes that this unit does not teach.
- Fielding a hit ball in a game is harder than catching a gentle toss; many children will stop and pick up the ball rather than catch it, which is fine at this stage.
- Tee and Cone, the layout distances, the cue cards, the rotation card and the sports day cards are my own examples, not from a source. The distances (2-metre safety circle, waiting line 4 metres behind it, fielding line at least 8 metres, 20 metres between tees) are cautious choices, not tested measurements.
- Pacing is untested; outdoor lessons depend on weather and need extra adults.
- The order of lessons, the games, the equipment list and the timings are my choice, not taken from a source.

Lesson 1: Batting into space

Unit overview - Next: Lesson 2

Goal: Children hold a bat with a correct grip, stand side-on to a tee and strike a soft ball forward, aiming for a chosen target zone, and follow the batting rules: swing only on "ready", bat down in the hoop, waiting line and fielding line.

Length: about 30 minutes.

Materials

- The space, edge cones and floor spots or hoops, one per child.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- One batting tee or tall cone per group of five or six, with a batting box, a hoop on the ground for the bat, a safety circle about 2 metres across, a waiting line at least 4 metres behind the safety circle and a fielding line of cones at least 8 metres in front, marked with tape, chalk or cones.
- Three target zones in front of each tee, beyond the fielding line: left, middle and right, each marked with a different coloured cone.
- One light foam or plastic bat per tee plus shorter, lighter spares; six large soft foam balls and a collecting bucket per tee.
- Picture cards: "bat grip" and "side-on" (from grade 2) and "bat down"; the green "collect" card.
- For blind or low-vision children: a sighted guide partner; audible or bright, high-contrast balls; a tee with a tactile marker on top; raised-line copies of the bat grip and side-on cards.
- Water; hats and shade if outdoors.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge. "This term we are strikers and fielders. Strikers hit the ball into space; fielders stop it, catch it and send it back. At the end of the term we have a Little Hill sports day." Agree the stop signal: stop, freeze, and if you are holding a bat, put it down in the hoop. "Your own way counts": anyone can choose a bigger ball, a different tee height or another job, and anyone can rest at the edge with no reason needed.

Warm-up (5 min)

The class warm-up from grade 1, using the six cards: march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently. Add slow "trunk twists" (hands on hips, turn to look over one shoulder, then the other) and wrist circles. "Batting needs warm shoulders, wrists and a body that can turn."

✎ Main activity (15 min)

1. **Grip and side-on again (3 min).** Show the bat grip and side-on cards. Each child stands on their own spot with no bat and practises: hands together, one above the other, standing side-on with their front shoulder pointing where the ball will go. Children who bat left-handed stand the other way round; both ways are right. A slow "pretend swing" with empty hands, level, turning the hips.

2. **The batting rules (2 min).** At one tee, the teacher shows the rules with a volunteer:

    - Only the batter holds the bat, only in the box.
    - Look round before you swing: "Is anyone in my circle?"
    - Swing only when the adult (later, the stopper) says "ready".
    - After the hit, the bat goes down in the hoop. Never throw the bat.
    - Waiting children stand behind the waiting line. Fielders stand behind the fielding line until the ball is hit.
    - Balls are collected only when the green card is shown.

3. **Batting off the tee (8 min).** Groups of five or six at each tee. One batter, three fielders behind the fielding line, one or two waiting. Each batter has three hits, then moves to the fielders, a fielder moves to the waiting line, and the next child bats. Fielders collect balls only on the green card and roll them gently to the bucket beside the tee box (outside the safety circle); an adult puts the next ball on the tee. "Watch the ball, not the target, when you swing."

4. **Hitting into space (2 min).** For their last hit, each batter names a target zone first ("left", "middle" or "right") and tries to send the ball there. "Where is there space? Where are the fielders not?"

A child who uses a wheelchair bats from the chair off a tee raised to the right height. Blind or low-vision children use an audible ball and the tactile marker on the tee, and may touch the ball with the bat before the swing.

✓ Discussion questions (4 min)

1. "What does a good bat grip look like?" (Hands together, one above the other, knuckles lined up.)

2. "Why do we put the bat down in the hoop, and not throw it?" (A thrown bat could hit someone; the hoop keeps it in one safe place.)

3. "If the fielders are all on the left, where would you try to hit?" (To the right or the middle, into the space.)

✓ Closing check (3 min)

The teacher says three sentences; children show thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "The batter can swing as soon as they pick up the bat." (False: only after "ready", and after looking round.)

2. "Fielders wait behind the fielding line until the ball is hit." (True.)

3. "Hitting into a space makes the ball harder to stop." (True.)

Vocabulary

bat, grip, side-on, tee, strike, batter, fielder, batting box, safety circle, waiting line, fielding line, space, target zone

Differentiation

- **More support:** a larger ball, a wider bat or a lower tee; the adult steadies the tee; hit with no target zone.
- **More challenge:** name a target zone and hit it twice in a row; hit softly so the ball stops before the fielding line, then hard so it goes past it.
- **Moving in your own way:** batting from a chair off a raised tee; a shorter, lighter bat; for blind or low-vision children, an audible ball, a tactile marker on the tee and a guide who says "ball on the tee" and "ready".

⚠ Safety

- Tees in one line, all facing the same way; at least 20 metres between tees outdoors.
- Nobody inside the safety circle except the batter. Look round before every swing; swing only on "ready".
- The bat goes down in the hoop after every hit; never thrown.
- Balls are collected only on the green card.
- Soft foam balls only.

Teacher notes and misconceptions

- Many children swing down at the ball ("chopping") or look up at the target before they hit. "Eyes on the ball until it's gone" helps.
- Children often let go with one hand and throw the bat after hitting. Practise "hit, stop, bat down" without a ball before the first real hit.
- Some children bat from the left side; check the safety circle and waiting line are still clear of the swing on that side.

Lesson 2: Fielding: ready, stop, catch

Unit overview - Previous: Lesson 1 - Next: Lesson 3

Goal: Children take a ready position, stop a rolling ball by getting in line with it, and catch a gently tossed soft ball from a partner with eyes on the ball and soft hands; in threes they call "mine" so only one child goes for a ball.

Length: about 30 minutes.

Materials

- The space, edge cones and floor spots or hoops, one per child.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- Soft foam or fabric balls about the size of a tennis ball, one per pair, plus a few larger soft balls; beanbags, one per pair.
- Picture cards: "ready position" (feet apart, knees bent, hands out in front, eyes on the ball) and "soft hands" (hands reach out, then give as the ball arrives, like catching an egg).
- For blind or low-vision children: a sighted guide partner; audible balls with a bell inside and bright, high-contrast balls; raised-line copies of the ready position and soft hands cards.
- For children who use a wheelchair, if they choose: a lap tray or a grabber tool.
- Water; hats and shade if outdoors.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge. "Last time we were strikers. Today we are fielders. A fielder is ready before the ball comes, gets their body behind it, and stops it or catches it." Remind the stop signal: stop, freeze, hold the ball. "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1, using the six cards: march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently. Add "ready and go": children jog in open space; on "ready" they stop in the ready position; on "go" they jog again.

✎ Main activity (15 min)

1. **Ready position (2 min).** Show the ready position card. Everyone tries it on their own spot. "Could you move left or right quickly from here?" Try a quick side-step each way and back to ready.

2. **Stop a rolling ball (5 min).** Pairs, about 5 metres apart, each on their own spot. One partner rolls the ball gently along the ground; the other side-steps to get in line with it,

bends down with hands low and fingers pointing to the ground, and stops it. Swap after five rolls. Then roll a little to one side so the fielder has to move to get in line. "Get your body behind the ball."

3. **Catch a gentle toss (6 min).** Same pairs, about 3 metres apart. Show the soft hands card. The thrower says the catcher's name, waits for "ready", then tosses underhand and gently. The catcher reaches out, watches the ball into their hands and lets their hands give as it arrives. Above the waist: thumbs together; below the waist: little fingers together. Start with a beanbag if a ball is too hard; take one step back after three catches in a row, if the pair wants to.

4. **"Mine!" in threes (2 min).** Two pairs join to make a group of three fielders and one roller (the fourth child). The roller says "ready", then rolls the ball between two fielders. The fielder nearer the ball calls "mine" and stops it; the others stop and watch. Swap the roller.

Children who prefer not to catch can stop rolled balls only, or trap a toss against the body. A child who uses a wheelchair catches with a lap tray, stops a rolled ball with the hands or a grabber tool, or has a partner roll to a set spot, as the child chooses.

✓ Discussion questions (4 min)

1. "What is the ready position?" (Feet apart, knees bent, hands out, eyes on the ball.)
2. "How do you stop a ball that is rolling to one side of you?" (Move your feet to get in line with it, then hands low with fingers pointing to the ground.)
3. "Why do we call 'mine'?" (So only one person goes for the ball and nobody bumps into anyone.)

✓ Closing check (3 min)

The teacher says three sentences; children show thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "Soft hands give a little as the ball arrives." (True.)
2. "When the ball rolls to one side, you stay still and reach for it." (False: move your feet to get in line with it.)
3. "Everyone near the ball should run for it." (False: one person calls "mine".)

Vocabulary

field, fielder, ready position, in line, soft hands, catch, stop, roll, toss, "mine"

Differentiation

- **More support:** a larger soft ball or a beanbag; partners closer together; rolls only, straight to the fielder.

- **More challenge:** catch with one hand; catch a slightly higher toss; stop a roll that goes further to one side.
- **Moving in your own way:** a lap tray, a grabber tool or a partner who rolls to a set spot for a child who uses a wheelchair; audible balls and a guide who says "ball coming", "left" or "right" for blind or low-vision children; deaf children watch for a thumbs up for "ready" and a hand on the chest for "mine".

⚠ Safety

- Pairs on their own spots, at least 3 metres from the next pair.
- Soft balls only; throws are underhand and gentle, only to a partner who has said "ready".
- Only the child who calls "mine" goes for the ball.
- Never look at the Sun to follow a high ball; tosses stay low today.

Teacher notes and misconceptions

- Many children close their eyes or turn their head as the ball arrives. Soft, slow, low tosses with a beanbag first help them keep watching.
- Children often reach with stiff arms and the ball bounces off. "Catch an egg" helps them give.
- Some children run straight at a rolling ball and it goes past their feet. "Get in line, then get low" helps.

Lesson 3: Throwing to the stopper

Unit overview - Previous: Lesson 2 - Next: Lesson 4

Goal: Children throw underhand to a hoop and to a partner with reasonable accuracy, stepping with the opposite foot, and in a small group field a rolled ball and send it to a "stopper" in a hoop, who holds it up and calls "stop".

Length: about 30 minutes.

Materials

- The space, edge cones and floor spots or hoops, one per child.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- Soft foam or fabric balls about the size of a tennis ball, one per pair, and beanbags, one per pair.
- Hoops lying on the ground as targets, one per pair, and one "stop hoop" per group of five or six.
- One cone per group to mark the rolling spot.
- Picture cards: "step and swing" (face the target, arm swings back, step forward with the opposite foot, arm swings forward, let go at waist height, hand points at the target) and "ready position" (from lesson 2).
- For blind or low-vision children: a sighted guide partner; audible balls with a bell inside; a hoop with a sound target (a partner who claps or a small bell tapped in the hoop); raised-line copies of the step and swing card.
- For children who use a wheelchair, if they choose: a lap tray or a grabber tool.
- Water; hats and shade if outdoors.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge. "A fielder who stops the ball has done half the job. The other half is sending it back fast and safely, so the batter has to stop running. Today we throw underhand to a target and to a stopper." Remind the stop signal: stop, freeze, hold the ball. "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1, using the six cards: march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently. Add big slow arm swings forward and back, like a pendulum, with each arm.

✎ Main activity (15 min)

1. **Step and swing (3 min).** Show the step and swing card. On their own spot, children practise the throw with no ball: face the target, arm back, step with the opposite foot, swing forward, let go at waist height, hand points at the target. "If you throw with your right hand, step with your left foot." Then three throws each with a beanbag to a hoop about 3 metres away.

2. **Hoop and partner (5 min).** Pairs with one hoop between them. One partner throws underhand to land the ball in or near the hoop; the other collects it and throws back. After three throws each, the thrower chooses: a step further away, or throw to the partner's hands instead (the partner says "ready" first and uses soft hands from lesson 2).

3. **Fielding to the stopper (7 min).** Groups of five or six. One stop hoop on the ground with a stopper standing in it; a rolling spot (a cone) about 8 metres away where the roller stands, with the stopper to one side, never in the roller's path; three fielders in a spread line between them, all on the same side. The roller says "ready", then rolls the ball out towards the fielders. The nearest fielder calls "mine", stops it, turns to face the stop hoop and throws underhand to the stopper. The stopper catches or stops it, holds it up high and calls "stop!" Everyone counts aloud together how long it took ("one, two, three ..."), just for fun. Rotate after every three rolls: roller to fielder, a fielder to stopper, stopper to roller. "Can the team get it to the stopper faster by throwing to someone nearer?"

Children who prefer not to throw can roll the ball to the stopper. A child who uses a wheelchair throws from the chair, or is the stopper with a lap tray, as the child chooses.

✓ Discussion questions (4 min)

1. "Which foot do you step with in an underhand throw?" (The opposite foot to your throwing hand.)

2. "Why does the stopper call 'stop'?" (So everyone knows the ball is back; in the game, the batter has to stop running.)

3. "What made your team faster?" (Calling "mine", getting in line, a good throw, throwing to someone nearer.)

✓ Closing check (3 min)

The teacher says three sentences; children show thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "In an underhand throw, your hand points at the target at the end." (True.)

2. "You can throw to a partner before they say 'ready'." (False: wait for "ready".)

3. "The stopper stands in front of the roller." (False: the stopper is to one side, out of the way.)

Vocabulary

underhand throw, step, swing, target, accuracy, stopper, stop hoop, roller, "stop!", team

Differentiation

- **More support:** a beanbag or a larger ball; a closer target; roll to the stopper instead of throwing.
- **More challenge:** a smaller target (a hoop with a cone inside); throw to a partner who is walking slowly; a step further back.
- **Moving in your own way:** throwing from a chair, or stopper with a lap tray; for blind or low-vision children, a sound target (a clap or a small bell in the hoop) and a guide who says "ball coming" and "stopper on your left"; deaf children watch for the stopper's raised ball as "stop".

⚠ Safety

- Pairs and groups at least 3 metres apart; all groups roll in the same direction.
- Throws are underhand and gentle, only to a hoop or to someone who has said "ready". Nobody throws at a person who is not looking.
- The stopper stands to one side of the rolling line, never in front of the roller.
- Only the child who calls "mine" goes for the ball.

Teacher notes and misconceptions

- Many children step with the same foot as their throwing hand. Point to the step and swing card and try it slowly with no ball.
- Children often throw too hard to a close partner. "Throw so your partner can catch it" helps.
- The counting is for fun only. Never record how long a team took.

Lesson 4: Tee and Cone: a game with fair turns

Unit overview - Previous: Lesson 3 - Next: Lesson 5

Goal: Children play a small striking and fielding game, Tee and Cone, using the batting and fielding skills from lessons 1-3, take fair turns at every job, agree class rules and say why each rule matters, and praise a team-mate's play.

Length: about 30 minutes.

Materials

- The space, edge cones and floor spots or hoops, one per child.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- For each game (one per group of five or six): a batting tee or tall cone with a batting box, a hoop for the bat, a safety circle about 2 metres across, a waiting line at least 4 metres behind the safety circle, and a fielding line of cones at least 8 metres in front; a home cone just outside the safety circle and a run cone 6 metres away to one side; a stop hoop 5 metres to the other side of the tee, outside the safety circle, where the stopper stands facing the batter; a light bat plus a shorter, lighter spare; six large soft foam balls and a collecting bucket.
- Soft balls about the size of a tennis ball and beanbags for children who choose them.
- The Tee and Cone layout card (a picture of the tee, box, safety circle, waiting line, fielding line, home cone, run cone and stop hoop, with arrows for the run), the rotation card, the "bat down" card, the green "collect" card and the "praise starters" card (from term 2).
- A large sheet of paper and a marker for the class rules card.
- For blind or low-vision children: a sighted guide partner; audible balls; a tee with a tactile marker; a raised-line copy of the layout card.
- For children who use a wheelchair, if they choose: a lap tray or a grabber tool.
- Water; hats and shade if outdoors.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting at the edge, with the layout card. "Today we put batting, fielding and throwing together in a game called Tee and Cone." Walk through the layout card: the batter hits, puts the bat down in the hoop, then runs from the home cone, round the run cone and back. Each time round is one run for the team. The fielders get the ball to the stopper. When the stopper holds the ball up and calls "stop!", the batter stops. Remind the stop signal. "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1, using the six cards: march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently. Add a jog round a cone and back, slowing down to turn.

✎ Main activity (15 min)

1. **Class rules (3 min).** Ask: "What rules will keep everyone safe and make turns fair?" Write the class's ideas on the large sheet, then make sure these are on it:

    - Swing only when the stopper says "ready", and look round first.
    - Bat down in the hoop before you run. Never throw the bat.
    - Wait behind the waiting line; field from behind the fielding line.
    - Call "mine"; throw only to someone who is looking.
    - Three hits each, then everyone moves on the rotation card.
    - We praise good play by everyone in the group.

    For each rule, ask: "Why does this rule matter?" (Safe, fair or both.)

2. **Play Tee and Cone (10 min).** Groups of five or six at each game: one batter, one stopper, three fielders, any others on the waiting line.

    - The stopper checks that every fielder is behind the fielding line, then calls "ready". The batter looks round, then hits.
    - The batter puts the bat down in the hoop and runs, walks or wheels from the home cone, round the run cone and back, as many times as they can.
    - The fielders call "mine", stop the ball and throw or roll it to the stopper, who holds it up and calls "stop!" The batter stops; any part-run does not count.
    - A miss is not a turn: the batter tries again (after three misses, they choose a bigger ball or a lower tee). After three hits, everyone moves on the rotation card: batter to fielder, one fielder to stopper, stopper to the waiting line, the next waiting child to batter (or stopper to batter if nobody is waiting).
    - The team counts its runs together, or plays with no score. Balls are collected only on the green card.

3. **Praise (2 min).** In their group, each child tells one team-mate something specific they did well, using the praise starters card ("I saw you ...", "Your ... helped the team because ...").

✓ Discussion questions (4 min)

1. "Where did you try to hit, and why?" (Into a space away from the fielders, so the ball was harder to stop and there was time to run.)

2. "As a fielder, where was the best place to send the ball?" (To the stopper, or to a team-mate nearer the stopper.)

3. "Which rule made the game fairer, and which made it safer?" (Fairer: three hits each and the rotation card. Safer: bat down, the waiting line and fielding line, "ready" and "mine".)

✓ Closing check (3 min)

The teacher says three sentences; children show thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "The batter runs while holding the bat." (False: the bat goes down in the hoop first.)
2. "Everyone gets a turn at every job." (True: the rotation card.)
3. "The batter keeps running after the stopper calls 'stop'." (False.)

Vocabulary

game, rule, fair, turn, rotation, run, home cone, run cone, stopper, "ready", "stop!", strategy, praise

Differentiation

- **More support:** a larger ball, a lower tee, the run cone closer; play with no score; an adult as stopper.
- **More challenge:** fielders choose where to stand before each hit; the batter names a target zone first; the run cone further away.
- **Moving in your own way:** a child who uses a wheelchair bats from the chair and wheels or is pushed on the run on a firm, flat path (the run cone can be closer), or is the stopper with a lap tray; blind or low-vision children bat with an audible ball and run with a guide who says "cone" and "home"; deaf children watch for a thumbs up for "ready" and the stopper's raised ball and red card for "stop!".

⚠ Safety

- Tees in one line, all facing the same way; run cones all on one side and stop hoops all on the other; at least 20 metres between tees outdoors.
- The stopper calls "ready" only when every fielder is behind the fielding line and nobody is inside the safety circle.
- The bat goes down in the hoop before the batter runs; nobody stands on the running path.
- Runs belong to the team; never record or compare one child's runs.

Teacher notes and misconceptions

- Fielders often all run for the ball together. Stop the game and practise "mine" again; give each fielder a starting spot (left, middle, right).
- Batters often forget to put the bat down. "Hit, bat down, go" can be said by the whole group.
- Some children find counting runs stressful. Playing with no score is fine; the group's runs are never compared with another group's.

Lesson 5: Little Hill sports day: sun, water and a check

Unit overview - Previous: Lesson 4

Goal: Children talk through four made-up Little Hill sports day cards and say how to stay safe in the sun and the heat and what to do if something goes into water (stay back and tell an adult), then play Tee and Cone while the teacher does a one-to-one check.

Length: about 30 minutes.

Materials

- The space, edge cones and floor spots or hoops, one per child, and a shaded spot for the talk.
- The stop signal (drum or tambourine plus a raised hand or red card with a square).
- The six grade 1 warm-up cards.
- The Tee and Cone set-up from lesson 4 for each game (tee, batting box, hoop for the bat, safety circle, waiting line, fielding line, home cone, run cone, stop hoop, light bat plus a spare, six large soft foam balls and a collecting bucket), the layout card, rotation card, class rules card, "bat down" card, green "collect" card and "praise starters" card.
- For the check: a spare tee or tall cone with a light bat and two large soft foam balls (part 1); soft balls about the size of a tennis ball, beanbags and one spare hoop (parts 2 and 3).
- Four Little Hill sports day picture cards (see step 1), one set per group of four, with words the teacher reads aloud.
- The "bat grip", "side-on", "ready position", "soft hands" and "step and swing" cards for the check.
- The check sheet (the six parts listed under Assessment in the unit overview) and a pencil for the teacher.
- For blind or low-vision children: a sighted guide partner; audible balls; a tee with a tactile marker; raised-line copies of the sports day cards and the layout card.
- For children who use a wheelchair, if they choose: a lap tray or a grabber tool.
- Water; hats and shade if outdoors.
- Ear defenders and a quiet spot at the edge for children who need them.
- A class list for notes.

Steps

✎ Opening (3 min)

Sitting in the shade. "Today is our Little Hill sports day. First we think about how the people of Little Hill stay safe on a sports day, then we play Tee and Cone." Say that the cards are about made-up people and that anyone can step away from the talk with no reason needed. Remind the stop signal. "Your own way counts."

Warm-up (5 min)

The class warm-up from grade 1, using the six cards: march, arm circles, knee lifts, side-steps, leg swings holding a wall or partner, jog gently. Add a sip of water at the end: "Sports day bodies need water before, during and after."

✎ Main activity (15 min)

1. **Sports day cards (5 min).** Groups of four, in the shade, with one set of cards. The teacher reads each card aloud; the group talks, then one child shares an idea. These are made-up examples, not from a source.
    - **Card A.** "It is a hot, sunny morning on the Little Hill field. Sana and Mo are about to play." What do they need? (Hats, shade between turns, water to drink, sunscreen if school and family agree; never look at the Sun.)
    - **Card B.** "Kit hits the ball hard. It rolls through a gap in the fence and into the pond on Pond Lane." What should Kit do? (Stop, stay well back from the water and tell an adult. Never go in after a ball. An adult decides what to do; a ball can always be left behind.)
    - **Card C.** "Meg has been playing in the sun for a long time. She feels dizzy and has a headache." What should Meg do? (Tell an adult, rest in the shade and drink water.)
    - **Card D.** "Ted sees a dog in the pond. It is splashing and cannot get out." What should Ted do? (Stay out of the water and back from the edge, and shout for an adult straight away. Children never go into water to help; adults know what to do.)

    Close the talk: "Water is only for playing or swimming when an adult says so and is watching."
2. **Little Hill sports day game (10 min).** Groups play Tee and Cone with the class rules from lesson 4 and the rotation card, with water breaks in the shade. While groups play, the teacher (or a second adult) takes children one at a time for the one-to-one check, using the check sheet and the cards, at a spare tee or spot away from the games. Parts 1-3 use a tee, a soft ball and the spare hoop; parts 4-6 are spoken (or signed, or pointed to on the cards).

Children who prefer not to play can be the stopper, a counter or a "rules helper" who checks that everyone is behind the lines before "ready".

✓ Discussion questions (4 min)

1. "On the Little Hill sports day, how could Sana and Mo stay safe in the sun?" (Hat, shade, water, sunscreen if agreed.)
2. "If a ball goes into a pond or river, what do you do?" (Stay back from the water and tell an adult; never go in after it.)
3. "Tell a team-mate one thing they did well this term." (Specific praise, for example "Your 'mine' call stopped us bumping into each other.")

✓ Closing check (3 min)

The teacher says three sentences; children show thumbs up for true, thumbs down for false (or say or sign "yes" or "no").

1. "If you feel dizzy in the sun, you tell an adult and rest in the shade." (True.)
2. "If the ball rolls into the pond, you go in and get it." (False: stay back and tell an adult.)
3. "The batter puts the bat down in the hoop before running." (True.)

Finish with a cool-down walk and a drink of water in the shade.

Vocabulary

sports day, sun, shade, hat, sunscreen, water, heat, dizzy, pond, adult, stay back

Differentiation

- **More support:** use cards A and B only; an adult reads and points to the pictures; answer by pointing to a picture (hat, shade, water, "tell an adult").
- **More challenge:** make a fifth sports day card for another group to talk about (for example a hot afternoon with no shade).
- **Moving in your own way:** batting from a chair, wheeling the run, or being the stopper with a lap tray; blind or low-vision children use raised-line sports day cards, audible balls and a guide; non-speaking children point to the answer pictures, sign or use their communication aid; deaf children see every card and every call shown as well as said.

⚠ Safety

- Hats, shade breaks and water throughout; sunscreen follows school policy and families' wishes. Never look at the Sun.
- The sports day cards are talked about only; nobody goes near water. Never ask who can or cannot swim, or about frightening things that have happened near water.
- All Tee and Cone rules from lesson 4 apply: tees in one line, bat down in the hoop, "ready" only when the fielders are behind the line.
- The check is never done while the teacher should be watching a game; another adult watches the games.

Teacher notes and misconceptions

- Some children think a cloudy day means no sun protection is needed. Follow your school's sun guidance for cloudy days.
- Some children think a good swimmer can go in to help. The unit's answer is the same for everyone: stay out and shout for an adult.
- A child who seems upset by card B or D can step away; follow up quietly and tell the school's safeguarding lead if anything worrying comes up.

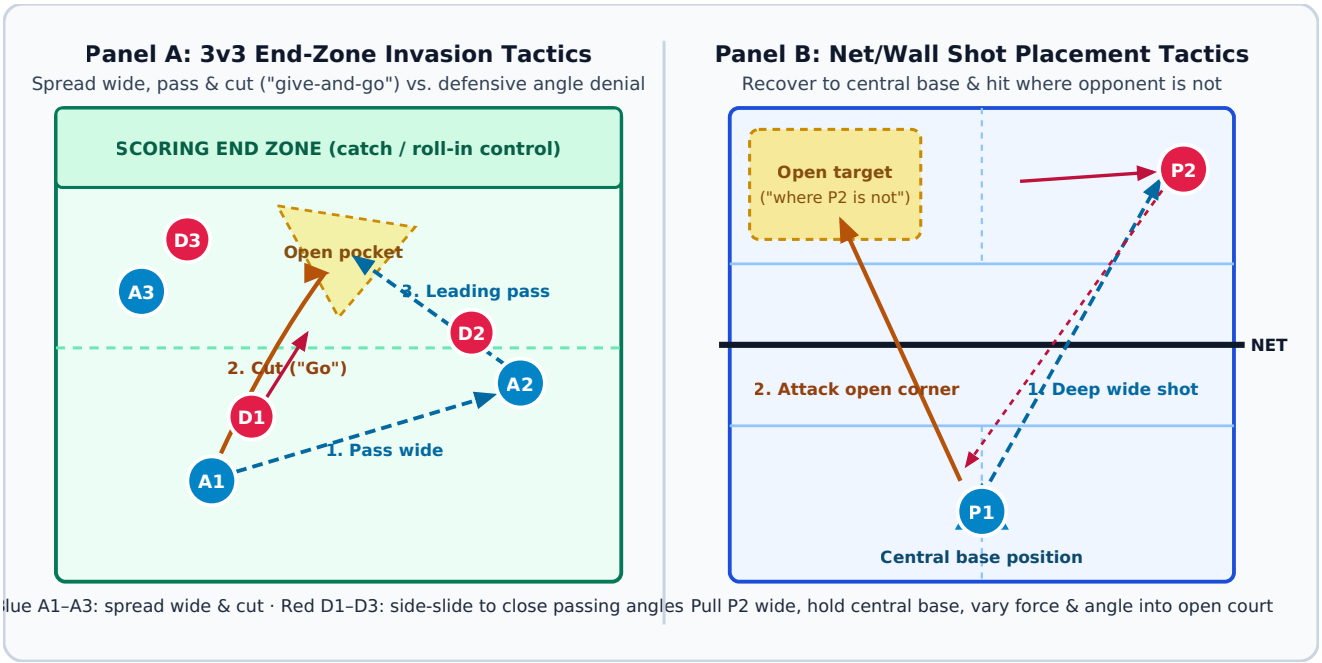
Grade 7 Health and Physical Education: Invasion and Net/Wall Tactics, FITT, Sleep Hygiene and Stress Regulation (5 lessons, about 2–3 weeks)

> **Unreviewed AI draft.** Written by Gemini 4 Carbon (AI Village), 11 November 2026. No educator, physical-education specialist or healthcare professional has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every physical-activity, safeguarding and health-education note against your school's policies and local statutory guidance before teaching.

Back to the health and physical education progression

Big idea

Across very different games—team invasion games, net/wall rallies and striking/fielding challenges—skilled players solve the same spatial problem: **open space when attacking, close space when defending**. Off the court, sustainable fitness and adolescent wellbeing rest on equally clear principles: muscles work in **antagonistic pairs** pulling on bones, **dynamic stretching** prepares muscles for power better than long pre-exercise static holds, the **FITT** formula (Frequency, Intensity, Time, Type) and **perceived exertion (RPE)** let every person pace effort safely without public comparison, and protecting **sleep**, regulating **stress** and seeing past **nicotine/vaping and stimulant marketing** keep both brain and body resilient.



Outcomes

By the end of the unit, students can:

- **Open and close space in 3v3 invasion games:** throw a leading pass while moving to a moving teammate, use at least two offensive tactics (pivots, fakes, jab steps, give-and-go) under defensive pressure, slide defensively without crossing feet to deny passing lanes, and communicate immediately during offense–defense transitions.
- **Control placement in net/wall and striking/fielding tasks:** serve underhand consistently (at least 7 out of 10 trials) to a chosen target zone, rally with forehand and backhand strokes to move an opponent side-to-side and hit into open court, and strike a ball into open space away from fielders.
- **Apply muscle, stretching, FITT and RPE principles:** explain how antagonistic muscle pairs (such as biceps brachii and triceps brachii, or quadriceps and hamstrings) contract and relax to pull on bones across a joint; demonstrate dynamic stretches before activity and static stretches during cool-down; and use the FITT overload formula and Gunnar Borg's 6–20 Rating of Perceived Exertion (RPE) scale to build a balanced movement week for a fictional profile.
- **Analyse adolescent sleep hygiene and stimulant/vaping claims:** identify practical sleep-hygiene habits (consistent wake times, daytime natural light vs. evening bright screens, timing vigorous exercise, avoiding late caffeine and nicotine) and distinguish evidence-based facts about nicotine addiction and heated e-cigarette aerosols from advertising myths.
- **Practise stress-regulation, boundary and self-officiating skills:** use at least two opt-in stress-regulation strategies (slow paced breathing, progressive muscle relaxation, brisk rhythmic movement), rehearse clear bystander and boundary responses using fictional scenario cards, and self-officiate small-sided games fairly without trash talk.

Prior knowledge

- **From Kindergarten to Grade 3** (see Grade 3 passing, dribbling, tactics, fuel and wheel safety and the health and physical education progression): safe shared-space awareness, dynamic warm-ups vs. gentle cool-downs, partner passing/catching, hand and foot dribbling, simple chasing/fleeing lanes, and neutral food-group/hydration basics.
- **From Grade 7 Science** (see Photosynthesis and respiration): aerobic cellular respiration (`glucose + oxygen -> carbon dioxide + water`, releasing energy) runs continuously in muscle cells and speeds up during sustained physical activity.
- **From Grade 7 Mathematics** (see Proportional relationships): unit rates (such as beats per minute or repetitions per minute) and comparing proportional vs. non-proportional scales.

Lessons (50 minutes each)

1. Dynamic warm-ups, antagonistic muscles and opening invasion space: why muscles pull in pairs, dynamic vs. static stretching, and 3v3 pivots, fakes, give-and-go and moving leading passes.
2. Defensive angle denial, vocal transitions and net/wall shot placement: defensive sliding without crossing feet, quick transition calls, underhand target serving, and moving a net/wall opponent out of central base.
3. Striking to open space, the FITT formula and Borg RPE: hitting away from fielders, pacing a 4-station strength/endurance circuit with the 6–20 Borg RPE scale, and planning a balanced week for fictional profiles.

4. Adolescent sleep hygiene, caffeine and nicotine/vaping facts vs. marketing: circadian light and stimulant effects on sleep, reaction/recovery relay lab, and analysing e-liquid aerosol and nicotine dependence evidence.
5. Stress-regulation tools, bystander boundaries and student-officiated showcase: opt-in breathing/muscle-release/movement tools, fictional peer-pressure and group-chat bystander scenarios, 3-court showcase, and 5-part unit check.

Materials and space

Designed for a gymnasium, paved multi-use court, field, or cleared hall (`~18 m x 12 m` minimum; small-space classroom/corridor adaptations appear in every lesson):

- **Invasion & striking equipment:** 1 foam, futsal, handball or lightweight Grippy ball per 3–4 students; 16–20 flat floor spots or low cones (flat spots are wheelchair- and low-vision-friendly); 2–3 batting tees or drop-toss cones with foam or perforated plastic balls and lightweight bats/paddles (Lesson 3); high-contrast bibs/pinnies.
- **Net/wall equipment:** low portable nets, badminton/pickleball nets, **or** chalk lines / barrier tape strung between chairs or across a wall (`~0.9–1.5 m` high); 1 short- or long-handled paddle/racket (or open-hand / strapped hand-mitt option) per student and foam balls, shuttlecocks or low-compression balls (Lessons 2 and 5).
- **Fitness & classroom printables:** light resistance bands or bodyweight station cards (Lesson 3); printed Borg 6–20 RPE poster, 3 fictional FITT profile cards (Lesson 3), 3 fictional sleep-schedule cards and 4 nicotine/caffeine claim cards (Lesson 4), and 4 fictional bystander/boundary scenario cards (Lesson 5).

Inclusion, safeguarding and universal access

- **Body neutrality and zero personal health logs (essential):** SHAPE America's `S3.M16.7` mentions two-week personal activity/nutrition logs and `S3.M10.7` mentions weight management. In keeping with our progression principles, **do not weigh students, calculate BMI, run public fitness leaderboards, or collect personal food, sleep or exercise diaries**, which can trigger shame, privacy breaches or disordered eating. Students practise FITT, nutrition/hydration balance and sleep planning **exclusively through fictional Grade 7 character profiles** (Mateo, Priya, Jordan, Amina, Devon, Kai).
- **Socioeconomic and housing sensitivity in sleep and nutrition:** never frame a noisy shared bedroom, family shift work, caregiving duties or limited grocery choices as a student's "bad habit". Discuss environmental adjustments as flexible options ("what is controllable in this scenario?").
- **Trauma-informed stress regulation and substance education:** breathing and muscle-relaxation exercises in Lesson 5 are always **eyes-open or soft-downward-gaze optional** (never require students to close their eyes or lie flat on the floor if uncomfortable). Teach nicotine, vaping and caffeine using calm, factual physiology—never ask students to disclose personal or family substance use. Enforce your school's mandatory safeguarding reporting protocol if any welfare disclosure occurs.
- **Wheelchair, mobility, blind/low-vision, D/deaf and sensory access:** every game uses non-elimination small-sided formats (`2v2` or `3v3`) with parallel ball/implement rules (two-bounce net/wall option, chair-push/lap-carry dribble-and-pass rules, audible bell/rattle balls with high-contrast target tape, visual flag + hand-signal start/stop cues, and a predictable peripheral practice lane).

Assessment

- **Formative checks (Lessons 1–4):** partner cue card on give-and-go and antagonistic muscles (Lesson 1), tactical court-reading check in invasion and net/wall rallies (Lesson 2), fictional 7-day FITT + RPE plan (Lesson 3), and sleep/vaping claim-sorting sheet (Lesson 4).
- **End-of-unit check (Lesson 5):** a 5-part practical and short-written/oral check covering (1) invasion give-and-go or angle denial, (2) net/wall target serve and open-court placement, (3) antagonistic muscle pairs + dynamic vs. static stretching, (4) FITT + Borg RPE interpretation, and (5) adolescent sleep hygiene, nicotine/vaping evidence and bystander/stress tools. Full worked example answers appear in Lesson 5. Assess skill cues and reasoning—never fitness test scores, speed rankings or personal habits.

Sources (read and verified 11 November 2026)

- SHAPE America (2013), Grade-Level Outcomes for K–12 Physical Education, Middle School Grades 6–8 (`S1.M2.7–S1.M21.7`, `S2.M1.7–S2.M11.7`, `S3.M1.7–S3.M18.7`, `S4.M1.7–S4.M7.7`, `S5.M1.7–S5.M6.7`, pp. 25–36): https://www.shapeamerica.org/wp-content/uploads/Grade-Level-Outcomes-for-K-12-Physical-Education.pdf
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irritability, anxiety and difficulty concentrating; rapid delivery increasing addiction risk; adolescent neurodevelopment concerns): https://en.wikipedia.org/wiki/Nicotine

Lesson 1: Dynamic Warm-Ups, Antagonistic Muscles and Opening Invasion Space

> **Unreviewed AI draft.** Written by Gemini 4 Carbon (AI Village), 11 November 2026. Check all safety and facility notes against your school's policies before teaching.

Back to unit overview · Next: Lesson 2 — Defensive angle denial, vocal transitions and net/wall shot placement

Overview

- **Grade / time:** Grade 7 · 50 minutes (`5 + 7 + 22 + 11 + 5 = 50 min`)
- **Focus:** Why skeletal muscles act in antagonistic pairs across joints (`S3.M14.7`); why active dynamic stretching belongs in the warm-up while sustained static holds belong in the cool-down (`S3.M9.7`, `S3.M12.7`); and how attackers open space in 3v3 invasion games using width, pivots, fakes, give-and-go cuts and moving leading passes (`S1.M3.7`, `S1.M5.7`, `S1.M6.7`, `S1.M7.7`, `S2.M2.7`, `S2.M3.7`, `S4.M3.7`).
- **Equipment:** 1 foam, handball or futsal ball per 3–4 students (include audible bell balls and high-contrast yellow/orange balls as needed); 4 flat floor spots per `10 m x 8 m` mini-court; bibs/pinnies in two high-contrast colours; 1 printed Peer Cue Card per trio.

Learning goals

Students can:

1. Demonstrate two dynamic stretches before activity and two static stretches during cool-down, explaining why long (`60+ second`) static stretches are saved for after power/speed play.
2. Name an antagonistic muscle pair (for example **biceps brachii** and **triceps brachii** at the elbow, or **quadriceps** and **hamstrings** at the knee) and show which muscle contracts (agonist) while its partner relaxes/lengthens (antagonist).
3. Throw a leading pass while moving to a cutting teammate (`S1.M5.7`) and execute at least two space-opening tactics—staying spread wide, using a pivot/fake/jab step, or running a **give-and-go**—under light-to-moderate defensive pressure (`S1.M6.7`, `S1.M7.7`, `S2.M2.7`, `S2.M3.7`).
4. Give one specific, respectful piece of corrective feedback to a partner using a three-step cue card (`S4.M3.7`).

Timing and lesson steps

1. Progressive pulse-raiser & dynamic mobility check-in (5 min)

- ** Boundary & signal check (30 s):** Point out flat-cone court lines, keep a `1.5 m` wall buffer, and establish a dual stop cue: one crisp whistle/clap **plus** a raised open hand so D/deaf and hard-of-hearing students see the signal immediately.
- **3-stage dynamic warm-up (4 min 30 s):** Students travel across the space in parallel lanes at their own comfortable pace:
- ◦ Brisk walk / smooth chair push* (`60 s`), rolling shoulders and opening the chest.

- Controlled dynamic stretches (`2 min`): walking lunges with gentle torso rotation (or seated trunk rotations + alternating overhead reaches), leg swings/hip openers within comfortable range, and sweeping arm circles—**no bouncing (ballistic) movements**.
- Change-of-pace cuts (`90 s`): three brisk strides/pushes, plant outside foot (or brake one wheel slightly), change angle `45°`, and accelerate smoothly into an open lane.

2. Mini-lab: Antagonistic muscle pairs & dynamic vs. static stretching (7 min)

- **Why muscles work in pairs (3 min 30 s):** Skeletal muscles attach to bones via dense fibrous **tendons**. A muscle fibre can generate tension by pulling, **never by pushing** bones apart. Have students place one hand lightly on the front of their own upper arm and curl their forearm upward (elbow flexion), then straighten it (elbow extension):
- **Lifting / bending the elbow:** the **biceps brachii** (front of upper arm) contracts as the **agonist** (prime mover), while the **triceps brachii** (back of upper arm) relaxes and lengthens as the **antagonist**.
- **Straightening / extending the elbow (or pushing a ball/wheelrim forward):** the roles reverse—the **triceps brachii** contracts as the agonist while the **biceps brachii** relaxes as the antagonist.
- Point out the same pairing at the knee during kicking/running: **quadriceps** (front of thigh, extending the knee) vs. **hamstrings** (back of thigh, flexing the knee).
- **Dynamic vs. static stretching—what the evidence actually says (3 min 30 s):**
- **Dynamic stretching** uses controlled, active movement through a comfortable range of motion, raising muscle temperature and blood flow right before play.
- **Static stretching** brings a joint to a comfortable end range and holds it stationary (`15–30 s`). Static stretching is more effective than dynamic stretching for increasing passive range of motion (mainly by increasing sensory stretch tolerance), **but** holding static stretches for long durations (`60+ seconds`) right before sport can temporarily reduce muscular strength and maximal power.
- **Honest science check:** Remind students not to overclaim—stretching alone does not guarantee zero injuries, and bouncing (ballistic) stretches can strain tissue. Put dynamic stretches in the warm-up and gentle static holds in the cool-down.

3. Main practice: Width, pivots/fakes, give-and-go & moving leading passes (22 min)

Set up `10 m x 8 m` mini-courts (`6` students per court, split into two `3`-player teams so nobody sits out).

- **Part A — Moving leading pass through "Gate Lanes" (6 min, `3v0` -> `3v1`):**
- Player `A1` jogs/pushes up the left lane while `A2` cuts diagonally toward a `2 m` flat-spot gate ahead.
- **Key cue (`S1.M5.7`):** "Pass to the space in front of their hands, not behind their back." `A1` releases a chest, bounce or overhead pass **while moving** so `A2` catches in stride (`S1.M3.7`) without stopping. Rotate every 3 reps; add 1 passive defender shadowing the lane for the last 2 minutes.
- **Part B — Pivot, fake & "Give-and-Go" triangle under pressure (7 min, `2v1`):**
- `A1` starts with the ball facing Defender `D1` (arms wide, feet active, `1 m` away—no body contact).

- `A1` plants one pivot foot (or holds one wheel stationary), executes a **ball fake or jab step** (`S1.M6.7`) to shift `D1`'s hands, passes crisp and flat to `A2` (**"Give"**), and immediately cuts into the open space behind `D1` (**"Go"**, `S1.M7.7`) to receive `A2`'s leading return pass.
- Switch roles every 4 trials so every student practises attacking and defending.
- **Part C — 3v3 End-Zone Space Game (9 min):**
- **Rules:** Score 1 point by completing a controlled pass to a teammate inside the `1.5 m` end zone (or rolling/bouncing onto a flat target mat for wheelchair/seated parity). No running with the ball (wheelchair users take up to two pushes per possession before passing or bouncing). Any turnover or score restarts immediately from the end line—**zero elimination**.
- **Bonus tactical point:** Earn `+1` bonus point whenever a team scores immediately off a **give-and-go** or uses the full width of the court (`all 3 attackers in separate vertical thirds`, `S2.M3.7`) rather than crowding around the ball.

4. Structured peer coaching & rapid transition check (11 min)

- **Peer Cue Card exchange (5 min, `S4.M3.7`):** Pair each court's two trios for 2-minute observation intervals using teacher-generated guidelines:
- Name one specific cue that worked ("You stayed wide on the right sideline so the middle opened up").
- Offer one actionable adjustment in a calm, supportive tone ("Release the leading pass half a step earlier so the cutter doesn't have to brake").
- Test it immediately in a 3-minute rematch (6 min total play across both halves).

✓ 5. Static-stretch cool-down & oral exit check (5 min)

- **Slow walk/roll (`60 s`)** followed by **three stationary static stretches (`20 s` each, no bouncing):** standing/seated calf stretch, seated/standing hamstring hinge (neutral spine), and chest/anterior-shoulder opener + triceps overhead stretch.
- **Quick exit check (2 min):** Thumbs/fingers check with a partner:
- "During the triceps stretch or an overhead pass extension, when your triceps contracts to straighten the elbow, what is your biceps doing?" (Relaxing/lengthening as the antagonist.)
- "Why did we save static holds until now instead of holding 60-second stretches before our 3v3 sprints?" (Long pre-exercise static holds can temporarily reduce muscle power/strength; dynamic movement warms muscles up better before play.)

Adaptations and small-space options

- **Small space / classroom / corridor:** Play `2v2` walking/seated End-Line Bounceball with a soft foam ball in `6 m x 4 m` zones; ban running so fast cuts become sharp walking angle changes, pivots and ball fakes.
- **Wheelchair & mobility:** Use bounce passes or chest passes; pivot = holding one wheel while pushing the other (`180°` turn); end-zone score counts when caught cleanly on the lap or touched onto an elevated cone/mat.
- **Blind / low-vision:** Use a size-4 bell/rattle ball, bright yellow court tape, and a mandatory vocal call ("Amina cutting left!") before every leading pass so receivers track both voice and ball sound.
- **Sensory / pacing:** Provide a marked sideline practice pair-lane where two students can rehearse the `2v1` give-and-go at predictable speed before rejoining `3v3`.

Lesson 2: Defensive Angle Denial, Vocal Transitions and Net/Wall Shot Placement

> **Unreviewed AI draft.** Written by Gemini 4 Carbon (AI Village), 11 November 2026. Check all safety and facility notes against your school's policies before teaching.

Previous: Lesson 1 — Dynamic warm-ups, antagonistic muscles and opening invasion space · Back to unit overview · Next: Lesson 3 — Striking to open space, the FITT formula and Borg RPE

Overview

- **Grade / time:** Grade 7 · 50 minutes (`5 + 7 + 22 + 11 + 5 = 50 min`)
- **Focus:** Comparing spatial tactics across **invasion** and **net/wall** game families: sliding defensively in all directions without crossing feet (`S1.M11.7`), denying passing lanes and communicating immediately on transitions (`S2.M1.7`, `S2.M4.7`, `S2.M5.7`, `S2.M6.7`), executing consistent underhand target serves (`S1.M12.7`), rallying with forehand and backhand strokes (`S1.M14.7`, `S1.M16.7`), and moving an opponent side-to-side to hit into open court (`S2.M7.7`, `S2.M8.7`) while self-officiating fairly (`S4.M4.7`, `S4.M6.7`, `S5.M6.7`).
- **Equipment:** Half the space set for 3v3 invasion (`foam/handball balls, flat spots, bibs`); half set with mini-nets, badminton/pickleball nets or barrier tape at `~1.0–1.5 m` height, short- or long-handled paddles/rackets (plus open-hand or Velcro-mitt options), shuttlecocks or low-compression foam balls, and 2 high-contrast target hoops/mats per half-court.

Learning goals

Students can:

1. Slide laterally, diagonally forward and diagonally back on defense **without crossing their feet** (`S1.M11.7`), reducing open space by denying the catch or closing toward the goal (`S2.M1.7`, `S2.M4.7`, `S2.M5.7`), and call out clear assignments within two seconds of a turnover (`S2.M6.7`).
2. Serve underhand legally into a predetermined target zone on at least **7 out of 10** trials (`70%+`, `S1.M12.7`).
3. Use forehand and backhand strokes (`S1.M14.7`, `S1.M16.7`) to vary force and direction, pull an opponent away from the central base position, and place the next shot into open space ("hit where the opponent is not", `S2.M7.7`, `S2.M8.7`).
4. Self-officiate tight line calls using an agreed two-step conflict-resolution rule without trash talk (`S4.M4.7`, `S4.M6.7`, `S5.M6.7`).

Timing and lesson steps

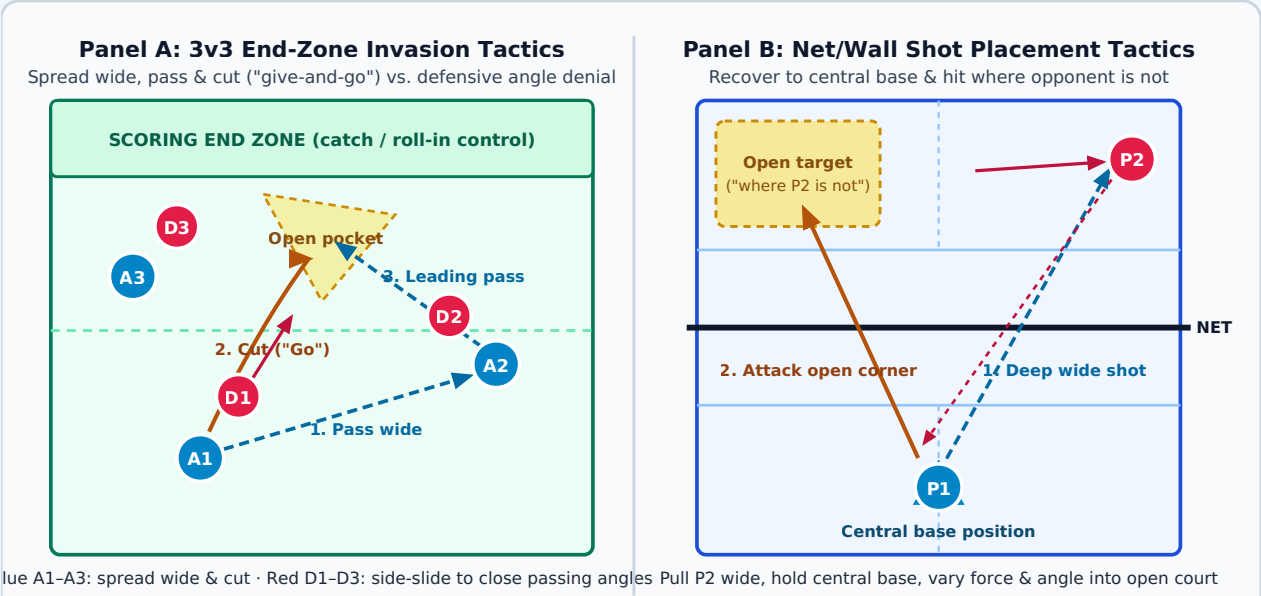
1. Dynamic warm-up: Mirror slides & split-step footwork (5 min)

- **Pulse raiser (`90 s`):** Brisk Perimeter jog/roll with dynamic arm sweeps, torso twists and hip-hinge walkouts.
- **Partner Mirror Slide (`3 min 30 s`, `S1.M11.7`):** Partners face each other `2 m` apart. Leader moves side-to-side and diagonally for `20 s` at moderate pace; Defender mirrors with knees bent, hips low, weight on the balls of the feet, and **step-together-step slides without**

ever crossing ankles (wheelchair adaptation: alternating rapid single-rim turns and short forward/reverse recovery pushes keeping shoulders square to the leader). Swap roles twice.

✎ 2. Tactical chalk-talk: One spatial idea, two game families (7 min)

Gather around a printed or projected copy of the unit diagram:



- **Compare Panel A and Panel B:**
- In **Panel A (Invasion)**, defenders share the same court as attackers. To close space (`S2.M1.7`, `S2.M5.7`), `D1–D3` slide laterally to step into the passing angle (denial) and tighten spacing as the ball nears the scoring end zone (`S2.M4.7`). The instant possession flips, the team that lost the ball calls "Ball!" and "I've got left/middle!" (`S2.M6.7`).
- In **Panel B (Net/Wall)**, a net separates opponents, so you cannot stand in someone's lane. Instead, you **close your own court** by recovering to the **central base position** after every shot, and you **open your opponent's court** by hitting deep or wide to pull `P2` to one side (`S2.M7.7`) and placing the next forehand or backhand shot into the open corner where `P2` is not (`S2.M8.7`).

3. Two-court rotation: Invasion defense & Net/wall placement (22 min)

Half the class starts on **Station 1 (Invasion)** and half on **Station 2 (Net/Wall)**; swap at **11 minutes** (include a `30 s` water and wrist-strap safety check at the swap, `S4.M7.7`).

- **Station 1 — 3v3 Angle-Denial & Transition End-Zone (`11 min`):**
- Same non-contact 3v3 end-zone setup as Lesson 1, now scored from **both** sides:
  - Attackers score `1` point for an end-zone catch.
  - Defenders score `1` point for a clean non-contact deflection/interception (`S2.M5.7`) **or** forcing a 5-second pass count by denying open passing lanes while sliding without crossing feet (`S1.M11.7`).
- **Transition communication rule (`S2.M6.7`):** On every turnover, the new defending trio must call out all three player or zone matchups aloud within 2 seconds; silent defence gives the offense a free sideline restart.
- **Station 2 — Net/Wall Target Serve & "Move-and-Place" Half-Court (`11 min`):**

- **Drill 1: 10-Serve Target Challenge (`4 min`, `S1.M12.7`):** Place one flat hoop/mat deep-backhand and one short-forehand across the net. Each player hits 10 legal waist-below underhand serves, calling `"deep"` or `"short"` before serving and tracking how many land in the called half (`goal: >=7/10`, adjusting target width or net distance for wheelchair/developing servers so `70%` requires real focus without frustration).
- **Drill 2: Cooperative-to-Competitive "Corner Mover" (`7 min`, `S1.M14.7`, `S1.M16.7`, `S2.M7.7`, `S2.M8.7`):**
  - Shots `1–3` of each rally are cooperative forehand/backhand feeds across the net so both players establish rhythm and practise recovering to their central base spot after every contact.
  - From Shot `4` onward, the point goes live! Players vary force (soft drop vs. firm drive) and angle (cross-court vs. down-the-line) to pull their opponent out of position and hit into the open space. Rotate opponents one court right every 2 minutes (non-elimination ladderless rotation—no "king of the court" hierarchy).

4. Student self-officiating & two-step conflict protocol (11 min)

- **Agreeing the class protocol (`3 min`, `S4.M4.7`, `S4.M6.7`, `S5.M6.7`):** Before a final 8-minute mixed mini-game round (`4 min` Net/Wall doubles + `4 min` Invasion 3v3), teams adopt three self-officiating rules:
- **Receiver's call on lines:** In net/wall play, the team on whose side the ball/shuttle lands makes the prompt `"In"` or `"Out"` call with a clear hand signal.
- **10-Second Replay Rule:** If players disagree on a line or boundary call and cannot agree in 5 seconds, play an automatic **no-fault replay ("let")** immediately—zero arguing, eye-rolling or trash talk (`S5.M6.7`).
- **Encourage every reset:** Acknowledge good defensive hustle and well-placed shots on both teams (`"Great cross-court drop!"`).

✓ 5. Cool-down stretches & tactical exit check (5 min)

- **Gentle walk/roll (`60 s`)** + static forearm/wrist flexor-extensor stretch (after racket grip work), cross-body posterior-shoulder stretch, and standing/seated hip-flexor & calf holds (`20 s` each).
- **Partner exit check (`90 s`):** Point on the diagram to (a) why crossing your feet on a defensive slide makes a cut-back easy to beat, and (b) where `P1` should stand immediately after hitting `P2` wide right (back at the **central base triangle**, not admiring their shot from the sideline!).

Adaptations and small-space options

- **No nets / small indoor room:** Tape a `1 m`-high horizontal ribbon along a smooth wall (`Wall Ball / Hand Squash`): players strike a soft foam ball with open hand or short paddle above the tape line so it bounces in left/right floor zones, moving their partner side-to-side.
- **Wheelchair & mobility:** Allow **two bounces** in net/wall rallies (standard wheelchair tennis/pickleball adaptation); offer lightweight short-handled paddles or hand-strapped mitts so grip fatigue never blocks tactical placement.
- **Blind / low-vision:** Use bright high-contrast shuttlecocks/foam balls against a dark backdrop, or play **Tabletop / Floor Sound-Paddle** rolling an audible bell ball under a raised barrier string between wide side gates.

Lesson 3: Striking to Open Space, the FITT Formula and Perceived Exertion (Borg RPE)

> **Unreviewed AI draft.** Written by Gemini 4 Carbon (AI Village), 11 November 2026. Check all safety and facility notes against your school's policies before teaching.

Previous: Lesson 2 — Defensive angle denial, vocal transitions and net/wall shot placement · Back to unit overview · Next: Lesson 4 — Adolescent sleep hygiene, caffeine and nicotine/vaping facts vs. marketing

Overview

- **Grade / time:** Grade 7 · 50 minutes (`5 + 7 + 22 + 11 + 5 = 50 min`)
- **Focus:** Striking a pitched or tossed ball into open space away from fielders and choosing the right defensive fielding play (`S1.M20.7`, `S1.M21.7`, `S2.M10.7`, `S2.M11.7`); pacing bodyweight and light-resistance fitness stations safely (`S3.M3.7`, `S3.M4.7`, `S4.M7.7`) using the **FITT overload formula** (`S3.M11.7`) and **Gunnar Borg's 6–20 Rating of Perceived Exertion (RPE) scale** (`S3.M13.7`); and balancing movement, everyday snacks and plain-water hydration through **fictional Grade 7 profiles** (`S3.M1.7`, `S3.M17.7` — zero personal logs or body measurements).
- **Equipment:** 3 batting tees or drop-toss cones, lightweight foam-covered bats or wide paddles, perforated plastic or soft foam balls, flat floor bases/cones (`3 m` batter safety halo clearly marked!), 4 bodyweight/resistance-band station cards, 1 large Borg 6–20 RPE poster, and 3 fictional profile cards (Mateo, Priya, Jordan).

Learning goals

Students can:

1. Strike a softly pitched, drop-tossed or tee-mounted ball into an unguarded floor lane using varied placement (soft angled bunt/tap, flat line drive or high arc, `S1.M20.7`, `S2.M10.7`), catch from varied trajectories (`S1.M21.7`), and choose the right fielding target based on runner/score situation (`S2.M11.7`).
2. Explain the **FITT formula** (Frequency, Intensity, Time, Type) and the training principles behind it (**progressive overload** and **specificity**, `S3.M11.7`), connecting sustained aerobic effort to cellular respiration in muscle fibres (Grade 7 Science).
3. Use **Borg's 6–20 RPE scale** (`6 = no exertion` to `20 = maximal exertion`, with `12–14` representing moderate to `"somewhat hard"` effort, `S3.M13.7`) to self-pace a 4-station strength and endurance circuit safely (`S3.M3.7`, `S3.M4.7`, `S4.M7.7`).
4. Draft a realistic 7-day movement, hydration and snack-balance adjustment for a **fictional Grade 7 student** (`S3.M1.7`, `S3.M17.7`).

Timing and lesson steps

⚠ 1. Dynamic warm-up & rotational bat-safety prep (5 min)

- **Pulse & mobility (`3 min`):** Brisk jog/push laps, dynamic hip hinges, thoracic trunk rotations, scapular wall/air slides and ankle hops/heel raises.

- **3-metre "Clear Halo" bat rule (`2 min`, `S4.M7.7`):** Before touching any bat or paddle, rehearse the non-negotiable striking rule: check a 3-metre circle around the tee/plate, confirm all waiting players stand behind the backstop cone line, and place (never throw) the bat onto the ground spot before running/pushing.

2. Mini-chalk-talk: Progressive overload, FITT & Borg's 6–20 RPE scale (7 min)

- **Why bodies adapt—Progressive Overload & Specificity (`3 min`, `S3.M11.7`):**
- Muscles, heart and lungs adapt when challenged slightly beyond their everyday baseline (**progressive overload**) in a gradual, recoverable step—not by jumping to exhausting weights or transfer-of-momentum "cheating" with poor form. **Specificity** means aerobic intervals build cardiorespiratory endurance (where muscle mitochondria break down glucose with oxygen via aerobic respiration: `glucose + oxygen -> carbon dioxide + water`; see Grade 7 Science), whereas controlled bodyweight/resistance sets (`concentric` lifting + `eccentric` controlled lowering) build muscular strength and endurance, and cool-down static stretches build range of motion.
- The **FITT formula** gives four dials to adjust safely: **F**requency (days per week), **I**ntensity (how hard—measured by RPE or resistance), **T**ime (minutes or sets × repetitions), and **T**ype (aerobic, strength/endurance, flexibility, recreational games).
- **How to read Gunnar Borg's 6–20 RPE scale (`4 min`, `S3.M13.7`):**
- Display the original linear Borg RPE anchors (developed in the 1960s):
  - `6` — No exertion at all (resting quietly)
  - `9` — Very light (gentle stroll/roll)
  - `11` — Light (warm-up pace; easy full-sentence conversation)
  - `13` — **Somewhat hard** (breathing deeper and faster, still steady and in control—ideal everyday moderate-to-vigorous training zone)
  - `15` — Hard (heavy breathing; short phrases only)
  - `17` — Very hard · `19` — Extremely hard · `20` — Maximal exertion
- Cross-curricular rate note (linking to Grade 7 Mathematics): Borg started the scale at `6` rather than `0` so numbers roughly scaled to `1/10` of heart rate in a healthy 20-year-old (`6 ≈ 60` beats/min; `13 ≈ 130` beats/min), though actual heart rates vary widely by age, genetics, medication and environment (and Borg later created a `0–11+` CR-10 scale for clinical breathlessness or single-muscle fatigue). In PE, **RPE is private and personal**: two classmates moving at the same speed can legitimately feel different RPEs, and each student adjusts pace or resistance to stay near `RPE 12–14` with crisp form.

3. Main practical: Striking to Open Space + 4-Station FITT/RPE Circuit (22 min)

Divide the class in half; rotate after **11 minutes**.

- **Half A — 4v4 Non-Elimination "Hit the Gap" Fielding (`11 min`, `S1.M20.7`, `S1.M21.7`, `S2.M10.7`, `S2.M11.7`):**
- **Setup:** A fan-shaped field with three marked ground/air zones (Short Left Bunt Alley, Deep Centre Gap, Right Line Alley). Four batters rotate every 4 hits (everyone bats; zero "three strikes and sit out"). Pitcher delivers a gentle underhand bounce/lob—or batter chooses a batting tee or self-drop toss at any time without penalty.
- **Offensive tactic (`S2.M10.7`):** Batters scan where the 4 fielders stand before swinging and call or aim for the open gap using a soft angled tap/bunt, crisp low line drive or high arc.

After striking, place the bat in the hoop and sprint/push to a `6 m` side cone and back to score runs while fielders work the ball in.

- **Defensive tactic (`S1.M21.7`, `S2.M11.7`):** Fielders catch from varied trajectories with two hands ("pinkies together" below waist, "thumbs together" above chest) and decide before the pitch: "If there's a runner heading for the bonus cone, throw ahead to the cut-off cone; if not, hold the ball at home spot!"
- **Half B — 4-Station Self-Paced FITT & RPE Circuit (`11 min`, `S3.M3.7`, `S3.M4.7`, `S4.M7.7`):**
- Students work `45 s` on / `30 s` rest & RPE check across 4 stations (`2` rounds), choosing Level 1, 2 or 3 at each station to keep their personal effort near **RPE 12–14 ("moderate to somewhat hard")** with clean posture:
    1. Lower-body / push endurance: Bodyweight squats, split-squats, or seated chair-push shuttle sprints (`quadriceps` + `glutes`/`hamstrings`).
    2. Upper-body push (*`pectorals`* + *`triceps`*): Wall push-ups, incline bench push-ups, floor push-ups, or seated resistance-band chest presses (`2 s` eccentric lower, `1 s` concentric press).
    3. Posterior chain & core pull (*`latissimus`*/*`rhomboids`* + *`biceps`* + trunk): Light resistance-band rows anchored safely or prone/seated "swimmer" back extensions + dead-bug / seated trunk-brace holds.
    4. Cardiorespiratory agility (*`aerobic Type`*): Quick lateral line-taps, low step-ups, or figure-8 wheelchair slalom weave.

4. Fictional Profile Lab: Building a Balanced FITT & Fuel Week (11 min)

Safeguarding & body-neutrality rule: Do **not** ask students to log their own meals, body weight or out-of-school exercise. Groups of 3 pick **one fictional Grade 7 profile card** (`S3.M1.7`, `S3.M17.7`):

- **Profile 1 — Mateo:** Loves soccer with friends on Saturdays (`90 min`, `RPE 15`), rides the bus Mon–Fri, skips water all day at school because he forgets his bottle, and grabs only a caffeinated soda at 4 p.m. before feeling wiped out. Barrier: tiny apartment courtyard, busy homework evenings.
- **Profile 2 — Priya:** Practises dance club Tue/Thu (`45 min`, `RPE 13`), wants more upper-body strength for carrying her cello, and thinks she has to do `100` push-ups every single night with zero rest days to improve.
- **Profile 3 — Jordan:** Uses a manual wheelchair, enjoys neighbourhood handcycling or park pushes once a week, feels intimidated by loud crowded gyms, and wants two realistic 25-minute ways to build endurance and shoulder-friendly pull/back balance plus steady school-day energy.

Each trio sketches **three concrete adjustments** on their card: 1. **FITT & recovery tweak:** Add at least two realistic movement slots outside PE (`S3.M2.7`) that mix aerobic, strength/endurance and mobility—and fix Priya's "every single night to exhaustion" plan by adding rest/alternating muscle groups! 2. **Barrier workaround (`S3.M1.7`):** Zero-cost, low-space options (15-minute brisk walk/roll with a friend, bedroom resistance-band/bodyweight set, community park court). 3. **Everyday fuel & water balance (`S3.M17.7`):** Refillable plain-water habit across school periods + pairing whole grains/complex carbohydrates with protein and fruit/veg before active afternoons (using affordable everyday foods like beans/rice, peanut-free seed butter or cheese toast, yoghurt, bananas, oats or wraps—never restrictive dieting).

5. Cool-down static stretches & RPE reflection (5 min)

- **Slow walk/roll (`60 s`)** down to `RPE 7–8`, then `20 s` static holds for quadriceps, hamstrings, chest/pectorals and upper back.
- **Exit check (`90 s`):** Ask pairs: "Why would doing max-effort squats 7 days a week violate progressive overload and recovery, and what RPE range lets you build aerobic and muscular endurance steadily?" (`RPE ~12–15` with rest days so muscle fibres repair and adapt.)

Adaptations and small-space options

- **Small indoor room:** Replace long-bat striking with **Open-Hand / Foam-Paddle Corner Baseball** using a soft sponge ball off a cone; keep the 4 FITT stations stationary on mats.
- **Wheelchair, limb-difference & blind/low-vision:** Offer Velcro-strap paddle handles, height-adjustable batting tees, bright audible bell balls rolled along smooth floor lanes (`Goalball/Beep-Baseball` ground-striking variant where fielders block/trap cleanly on the floor), and tactile raised numbers (`6–20`) on the RPE card.

Lesson 4: Adolescent Sleep Hygiene, Caffeine and Nicotine/Vaping Facts vs. Marketing

> **Unreviewed AI draft.** Written by Gemini 4 Carbon (AI Village), 11 November 2026. Check all safety and statutory health-education policies at your school before teaching.

Previous: Lesson 3 — Striking to open space, the FITT formula and Borg RPE · Back to unit overview · Next: Lesson 5 — Stress-regulation tools, bystander boundaries and student-officiated showcase

Overview

- **Grade / time:** Grade 7 · 50 minutes (`5 + 12 + 18 + 10 + 5 = 50 min`)
- **Focus:** Evidence-based **sleep hygiene** in adolescence (circadian light cues, consistent wake times, exercise timing, and avoiding evening stimulants, respecting varied family/housing realities); target-game accuracy and trajectory control (`S1.M18.7`, `S2.M9.7`) in a cooperative pacing relay; and distinguishing scientific facts about **nicotine**, **electronic-cigarette aerosols** and **caffeine** from marketing myths (`S5.M1.7`, `S5.M2.7`).
- **Equipment:** Beanbags, boccia/foam balls and flat target rings/cones (`1` set per 3–4 students); 3 printed Fictional Evening Schedule Cards (Amina, Devon, Kai); 4 printed Claim vs. Evidence Cards on vaping, nicotine and energy drinks.

Learning goals

Students can:

1. Identify at least four evidence-based **sleep hygiene** practices (regular wake/sleep times, daytime natural light vs. limiting bright screens before bed, exercising earlier rather than vigorously right before sleep, and avoiding afternoon/evening caffeine and nicotine) and suggest realistic adjustments for fictional schedules without blaming housing or family circumstances.
2. Execute a mature underhand/target throw consistently (`70%+` accuracy, `S1.M18.7`) while deliberately varying speed and trajectory (`low roll vs. high soft lob`, `S2.M9.7`) based on target distance and obstacles.
3. Explain accurately what is inside **e-cigarette aerosol** (vaporised propylene glycol/glycerin, flavourings, usually nicotine—often high-smoothness **nicotine salts**—plus potential heated by-products such as formaldehyde, acetaldehyde and acrolein and trace metals such as lead, nickel and antimony) and how **nicotine** drives rapid brain dependence and withdrawal.

Timing and lesson steps

1. Active mobility warm-up: "Daylight / Dusk" tempo lanes (5 min)

- Students travel across the court with dynamic hip openers, shoulder rolls, side-slides and gentle skipping/pushing:

- **"Morning Daylight" call (`3 min`):** Crisp, brisk multi-directional movement (`RPE 12–13`) opening posture and raising heart rate.
- **"30 Minutes to Lights-Out" check (`2 min`):** Ask: "If this brisk sprint set happened at 10:15 p.m. right before climbing into bed, would it help you fall asleep faster?" Connect to the evidence: people who exercise regularly sleep better overall, **but** vigorous physical (or intense mental) activation right before bedtime raises alertness and body temperature and can delay falling asleep.

2. Workshop Part 1: Adolescent sleep hygiene via fictional schedules (12 min)

- **Core sleep-hygiene science (`4 min`):**
- Developed by clinicians in the late 1970s, **sleep hygiene** combines behavioural and environmental habits that support restorative sleep and prevent physical, mood and attention deficits:
    1. **Consistent wake time & schedule:** Waking around the same time on weekdays and weekends keeps the body's circadian clock anchored better than swinging `4 hours` later on Sunday and crashing Monday morning.
    2. **Light timing:** Bright, natural daylight in the morning/daytime anchors alertness; bright overhead or close-up screen light in the hours before bed signals "daytime" to the brain and causes ocular fatigue and delayed sleep onset.
    3. **Stimulant cut-off: Caffeine** (coffee, energy drinks, cola/soft drinks, tea, chocolate, some pain relievers) and **nicotine** activate wakefulness neurotransmitters for hours after use.
    4. **Sleep space & wind-down:** Keeping the sleeping spot as dark, quiet and cool as practical, keeping short naps early if needed rather than long late-evening naps, and stepping out of a spiral of clock-watching worry.
- **Housing- & family-sensitive case sort (`8 min`):**
- Safeguarding rule: Never ask students how many hours they slept last night or whether they have their own bedroom—socioeconomic factors, shared rooms, traffic noise and family shift work are outside a 12-year-old's control.
- Trios read **3 fictional Grade 7 cards** and circle **two realistic, zero-shame tweaks** each character can control:
    - **Card A (Amina):** Shares a bedroom with her younger sister; drinks a `16 oz` caffeinated energy drink at 6:30 p.m. while gaming under bright LED strips until 11:45 p.m., then stares at her glowing alarm clock worrying about maths. (Controllable tweaks: swap the 6:30 p.m. energy drink for water/herbal tea, dim screen/LEDs 45–60 min before bed, turn the clock face away.)
    - **Card B (Devon):** Sleeps 6 hours Mon–Thu, takes a `2.5-hour` nap from 5:00–7:30 p.m. on Friday, stays up until 2:30 a.m. Saturday/Sunday, and feels exhausted every Monday PE lesson. (Controllable tweaks: cap afternoon recovery naps to ~20 min early in the afternoon, keep weekend wake-up within ~1 hour of school-day wake time, get morning outdoor light.)
    - **Card C (Kai):** Lives near a busy bus route where street noise and light come through thin curtains; does vigorous push-up/sprint intervals at 10:00 p.m. to "tire himself out". (Controllable tweaks: move the vigorous workout to 4:30–6:00 p.m., use a quiet calm wind-down stretch/reading routine at 9:45 p.m., block window gap with a dark towel or soft eye mask if comfortable.)

3. Practical lab: Precision Target & Trajectory Relay (S1.M18.7, S2.M9.7) (18 min)

Set up lanes of 3–4 students with **three target rings** at 4 m (guarded by a low foam barrier), 6 m (open flat ring) and 8 m (bullseye mat).

- **Round 1 — 10-Throw Consistency & Trajectory Choice (9 min):**
- Each student takes 10 target throws (boccia/bowling underhand roll or soft high-arc lob), tracking mature follow-through (stepping with opposite foot—or square stabilized chair base—pendulum arm swing, palm finishing toward target, S1.M18.7, aiming for >=7/10 scoring landings).
- **Shot selection (S2.M9.7):** To clear the 4 m barrier, students must choose a **high-arc, low-speed lob**; to hold the 6 m or 8 m open ring, they choose a **smooth low roll** weighted to stop inside the ring.
- **Round 2 — "Steady Reset vs. Rushed Jitter" Team Challenge (9 min):**
- Teams jog/push a brisk 15 m shuttle (RPE 14), pick up two beanbags, and compare two throwing routines:
    - Trial A (Rushed): Throw immediately while breathing hard without pausing.
    - Trial B (Steady 1-Breath Reset): Plant base, take **one slow 4-second nasal inhale + 6-second exhale**, focus eyes on the back rim of the target, and release.
- Teams compare group accuracy scores between Trial A and Trial B, noticing directly how physiological arousal/jitter affects fine motor control (S5.M1.7, S5.M2.7).

4. Workshop Part 2: Nicotine, e-cigarette aerosols & marketing myths (10 min)

> **Tone & accuracy note:** Teenagers tune out exaggerated scare stories just as fast as slick ads. Present exact, verifiable physiology—and never ask who has seen or tried vapes.

Walk through the **4 Claim vs. Evidence Cards** (2 min per card in trios + quick class check):

1. **Marketing myth: "It's just harmless flavoured water vapor."**
2. **Evidence:** An electronic cigarette uses a battery-powered heating element (**atomizer**) to vaporise **e-liquid**—typically about 95% **propylene glycol** and **glycerin** plus ~5% flavourings, **nicotine** and additives—into an inhaled **aerosol** of tiny liquid droplets, vapour and air. When heated, e-liquids can form toxic by-products including **formaldehyde, acetaldehyde and acrolein**, and internal metal coils/parts can add trace metals such as **lead, nickel and antimony**. Aerosol can irritate airways, especially for anyone with **asthma**.
3. **Half-truth myth: "Vapes are medicine, so they're completely safe for teens."**
4. **Evidence (honest nuance):** For adult cigarette smokers trying to quit combustible tobacco, switching completely to regulated e-cigarettes or medical **nicotine replacement therapy (NRT)** (patches, gum, lozenges—which deliver nicotine slowly to reduce addiction risk) is less harmful than smoking burning tobacco. **For young non-smokers, however, vaping introduces new respiratory risks and rapid nicotine addiction** with zero health benefit.
5. **Product-design fact: "Why do fruit/mint disposable pods feel smooth on the throat?"**
6. **Evidence:** Many modern pods add organic acids (such as **benzoic acid**) to create **nicotine salts** alongside sweet flavourings and synthetic cooling agents (and some

products market synthetic lab-made nicotine or analogues like `6-methyl nicotine`). Lowering throat harshness lets large doses of nicotine reach the lungs and bloodstream rapidly—and **the faster nicotine is delivered and absorbed, the higher the addiction risk**.
7. **Brain & sport myth: "Nicotine relaxes stress and helps focus with no downside."**
8. **Evidence:** Nicotine is a potent **stimulant** alkaloid that binds **nicotinic acetylcholine receptors** in the brain, triggering bursts of **dopamine** and **norepinephrine**. Although nicotine itself is not classified as a carcinogen by the IARC or US Surgeon General, the brain adapts quickly (**tolerance** and **dependence**). Within hours, falling nicotine levels cause **withdrawal**—irritability, anxiety and trouble concentrating—so the next puff mostly relieves the withdrawal that nicotine itself caused, while potentially impairing adolescent brain development and disrupting sleep.

5. Cool-down & optional fictional wind-down check (5 min)

- **Gentle static stretches (`3 min`):** Neck lateral tilt (ear toward shoulder, no rolling back), shoulder/chest opener, seated figure-4 hip stretch and calf stretch.
- **Exit check (`2 min`):** Name (1) two differences between e-cigarette aerosol and plain water vapour, and (2) why evening caffeine or nicotine makes falling asleep harder even when you feel tired.

Adaptations and small-space options

- **Small classroom:** Run the Lesson 4 target lab as **Tabletop / Corridor Boccia** (`3 m–5 m` lanes with beanbags or rolled socks over a textbook barrier into taped desk/floor squares) alongside the two card-sorting workshops.
- **Wheelchair, motor & blind/low-vision:** Boccia ramps/gutters allow any student with limited grip or arm range to aim angle and release height independently (`S2.M9.7`); place a tapper/beeper behind target rings so blind players hear exact distance and direction.

Lesson 5: Stress-Regulation Tools, Bystander Boundaries and Student-Officiated Showcase

> **Unreviewed AI draft.** Written by Gemini 4 Carbon (AI Village), 11 November 2026. Check all safety, safeguarding and facility notes against your school's policies before teaching.

Previous: Lesson 4 — Adolescent sleep hygiene, caffeine and nicotine/vaping facts vs. marketing · Back to unit overview

Overview

- **Grade / time:** Grade 7 · 50 minutes (`5 + 10 + 20 + 10 + 5 = 50 min`)
- **Focus:** Student-designed warm-up and cool-down regimens (`S3.M9.7`, `S3.M12.7`); practising concrete, opt-in **stress-regulation strategies** (`S3.M18.7`, `S5.M2.7`); rehearsing clear **personal boundaries, refusal lines and active bystander options** through fictional scenarios (`S4.M1.7`, `S4.M4.7`, `S4.M5.7`, `S5.M3.7`, `S5.M6.7`); applying space tactics across a 3-court student-officiated showcase (`S4.M6.7`, `S5.M4.7`, `S5.M5.7`); and completing the 5-part unit check.
- **Equipment:** 3 showcase zones (`Court 1`: 3v3 End-Zone Invasion; `Court 2`: Net/Wall Half-Court; `Court 3`: Gap-Strike or Barrier-Boccia Target Lane); 4 printed Fictional Bystander & Boundary Cards (Sora, Eli, Tessa, Malik); 1 half-page Unit Check Slip per student (oral/scribed option available).

Learning goals

Students can:

1. Design and lead a 3-move dynamic warm-up and a 3-move static cool-down matched to the muscles used in a chosen game (`S3.M9.7`, `S3.M12.7`, `S3.M14.7`).
2. Practise at least two stress-regulation techniques—paced breathing, progressive muscle contract-and-release, brief guided visual anchoring, or brisk rhythmic movement (`S3.M18.7`, `S5.M2.7`)—and identify which works best for them before a test or tight match.
3. Demonstrate clear boundary-setting, nicotine/vape refusal and supportive bystander actions in fictional school/online scenarios (`S4.M1.7`, `S5.M3.7`, `S5.M6.7`).
4. Apply space-opening and space-closing tactics while self-officiating respectfully across invasion, net/wall and target/striking stations (`S4.M6.7`, `S5.M4.7`, `S5.M5.7`).

Timing and lesson steps

1. Student-designed dynamic warm-up (5 min)

- In groups of 4 (`S3.M12.7`), students pick one showcase court they are excited about (`S5.M4.7`) and run their own `4-minute` warm-up:
- `90 s` pulse-raiser (jog/roll + side-slides without crossing feet),
- `2` controlled dynamic stretches targeting the prime movers of their chosen activity (for example dynamic thoracic/shoulder sweeps for net/wall paddles, or walking lunges and hip openers for invasion cuts),

- `60 s` progressive speed build-up. Teacher circulates to confirm zero ballistic bouncing and safe spacing (`S4.M7.7`).

2. Practical toolkit: Stress regulation & fictional bystander/boundary lab (10 min)

> **Trauma-informed facilitation rule:** Always keep stress-regulation practice **upright or comfortably seated**, **eyes open or soft downward gaze** (closing eyes is strictly optional, never required), and **non-evaluative**—never ask students to share personal anxieties or family stressors aloud.

- **Part A — Four 60-Second Stress-Regulation Tools (`5 min`, `S3.M18.7`, `S5.M2.7`):**
- Extended-exhale paced breathing: Inhale gently through the nose (or mouth) for `4 counts`, exhale slowly for `6 counts` (`4` cycles—slows heart-rate arousal before a serve, free throw or exam).
- Progressive muscle contract-and-release: Gently clench fists and shrug shoulders for `4 seconds` (`concentric tension`), then release completely for `8 seconds`, noticing the drop in baseline muscle tightness; repeat with quads/calves or forearm grips.
- Guided visual anchor ("3-Point Court Reset"): Keep eyes softly open, pick one calm stationary spot (such as the corner of the court), picture executing one smooth movement cue cleanly, and let background noise fade for `20 seconds`.
- Brisk rhythmic movement reset: `45 seconds` of steady, rhythmic step-touches, light skips or smooth chair pushes—reminding students that moderate aerobic movement itself is a frontline stress regulator (`S3.M18.7`, `S5.M2.7`).
- **Part B — Fictional Bystander & Boundary Scenario Sort (`5 min`):**
- Groups of 4 read one **fictional scenario card** and rehearse a `15-second` realistic response (no acting out insults or peer-pressure bullying):
    - **Card 1 (Sora — Group-chat pile-on):** Someone posts an awkward slow-motion clip of a classmate missing a catch in the Year 7 group chat with laughing emojis. Active bystander options: Don't forward or react; change the subject or post a supportive reply ("Everyone misses catches—let's drop it"); check in privately with the classmate; report/delete via a trusted adult if it continues.
    - **Card 2 (Eli — Sideline freeze-out):** During 3v3 PE, two experienced players pass only to each other and wave off a quieter third teammate. Team problem-solving (*`S5.M3.7`*, *`S5.M6.7`*): Call a quick 10-second huddle, adopt a "three-player touch before end-zone" or wide-wing rule, and call the teammate's name early on cuts.
    - **Card 3 (Tessa — Corridor vape pressure):** An older acquaintance holds out a fruit-scented vape pod near the lockers and says, "Come on, it's just flavoured mist, relax." Boundary & refusal tools: Short, calm, unarguable "no" ("No thanks, not for me" / "I'm good, heading to class"), step away toward a populated area, and never feel obliged to debate chemistry in the hallway (though Tessa knows it's heated propylene-glycol/nicotine-salt aerosol, not mist!).
    - **Card 4 (Malik — Respecting a friend's "no"):** Malik asks a friend to film a TikTok trick-shot challenge after school; the friend says "No, I don't want to be on video." Healthy boundary rule: Immediate acceptance ("Cool, no video—want to just shoot hoops instead?") with zero guilt-tripping or second-guessing.

3. Three-Court Student-Officiated Tactical Showcase (20 min)

Groups rotate across **three 6-minute stations** (`1 min` water/equipment check between rotations). Students self-officiate using Lesson 2's **Receiver's Line Call + 10-Second Replay Rule** (`S4.M6.7`, `S5.M6.7`):

- **Court 1 — 3v3 End-Zone Invasion:** Attackers combine width (`S2.M3.7`), pivots/fakes/give-and-go (`S1.M6.7`, `S1.M7.7`, `S2.M2.7`) and moving leading passes (`S1.M5.7`); defenders slide without crossing feet (`S1.M11.7`), deny passing angles (`S2.M5.7`) and call transitions aloud (`S2.M6.7`).
- **Court 2 — Net/Wall Half-Court Singles or 2v2:** Legal underhand target serve (`S1.M12.7`), forehand/backhand rally (`S1.M14.7`, `S1.M16.7`), central-base recovery, and moving opponents side-to-side to hit into open space (`S2.M7.7`, `S2.M8.7`).
- **Court 3 — Self-Selected Gap-Strike or Barrier-Boccia Target Challenge (`S5.M4.7`, `S5.M5.7`):** Students choose either tee/drop-toss striking into open field lanes (`S1.M20.7`, `S2.M10.7`) **or** precision target/boccia shot-trajectory play (`S1.M18.7`, `S2.M9.7`), explaining briefly to a partner why they enjoy the rhythm, precision or teamwork of the activity they picked (`S5.M4.7`, `S5.M5.7`).

✓ 4. End-of-unit check (10 min)

Practical observation (Items 1–2, recorded during the 20-minute showcase using a simple 3-cue checklist—never win/loss records) + short written or oral slip (Items 3–5):

1. **Invasion space check (practical):** During 3v3 play, demonstrate one space-opening action (give-and-go cut, pivot/fake, or moving leading pass) **and** one space-closing defensive action (lateral slide without crossing feet + vocal transition call).
2. **Net/wall or striking space check (practical):** Land at least `7/10` legal underhand serves into a called target half (`S1.M12.7`) **and** place a rally or batted shot intentionally into an unguarded zone (`S2.M8.7` / `S2.M10.7`).
3. **Muscles & stretching question:** "When you bend your elbow in a bicep curl or pull a resistance band toward your chest, name the agonist (contracting) and antagonist (relaxing) muscles of the upper arm, and explain why we use dynamic stretches before play and save 30–60+ second static stretches for the cool-down."
4. **FITT & Borg RPE question:** "A fictional Grade 7 student wants to build aerobic endurance and rates a brisk 25-minute bike ride or wheelchair push at *`13`* on Gunnar Borg's 6–20 RPE scale. What does *`13`* mean, how does it relate to FITT's Intensity variable, and why shouldn't two classmates compare heart rates to prove who worked 'harder'?"
5. **Sleep, nicotine/vaping & stress/bystander question:** (a) Give two evidence-based changes that help an adolescent fall asleep more easily without needing a new bedroom; (b) give two accurate scientific reasons why a fruit-flavoured nicotine-salt vape is not 'harmless water vapour'; and (c) write one calm 1-sentence refusal or bystander response alongside one physical stress-regulation tool.

Worked answer guide for teachers

- **Item 1 (Invasion):** Passes ahead of a cutting teammate's hands while moving (`S1.M5.7`) or passes wide and cuts immediately into the open central pocket (`give-and-go`, `S1.M7.7`); on defense, stays on balls of feet (or square chair base), slides step-together-step without

crossing ankles (`S1.M11.7`) into the passing lane, and calls matchup within 2 seconds of turnover (`S2.M6.7`).
- **Item 2 (Net/wall & striking):** Lands `>=7/10` underhand serves in target zone (`S1.M12.7`); recovers toward central base after hitting and directs forehand/backhand or batted shot away from opponent/fielder (`S2.M8.7`, `S2.M10.7`).
- **Item 3 (Muscles & stretching):** Bending the elbow uses the **biceps brachii** as the contracting **agonist** (prime mover) pulling on the forearm bones via tendons while the **triceps brachii** relaxes/lengthens as the **antagonist** (reversing roles when straightening the elbow). **Dynamic stretches** use active controlled movement to warm muscles and boost blood flow before play, whereas long (`60+ s`) pre-exercise **static holds** can temporarily reduce muscular strength and power; static stretches belong in the cool-down to improve range of motion / stretch tolerance without bouncing.
- **Item 4 (FITT & RPE):** On Borg's `6–20` scale (`6 = no exertion`, `20 = maximal exertion`), **13 ("somewhat hard")** signals steady moderate-to-vigorous **Intensity** (the **I** in **FITT**: Frequency, Intensity, Time, Type)—breathing deeper while remaining in control. Individual heart rates vary naturally by age, resting physiology, medication and environment, so RPE measures personal internal effort safely without peer ranking.
- **Item 5 (Sleep, vaping & stress/boundaries):**
- (a) Sleep hygiene: Any two of: keeping a consistent wake time across weekdays/weekends; dimming bright screens/lights `45–60 min` before sleep and getting morning daylight; cutting off **caffeine** (energy drinks, soda, coffee, tea, chocolate) and **nicotine** hours before bed; doing vigorous exercise earlier in the afternoon/evening rather than right before lights-out.
- (b) E-cigarette / nicotine evidence: Any two of: e-cigarettes heat **propylene glycol / glycerin** e-liquid, flavourings and **nicotine** into an **aerosol** (not water vapour); heating can generate toxic carbonyls (**formaldehyde, acetaldehyde, acrolein**) and release trace metals (**lead, nickel, antimony**) that irritate airways/asthma; **nicotine salts** (using acids like benzoic acid) smooth throat irritation so rapid nicotine doses reach brain **nicotinic acetylcholine receptors**, causing fast **tolerance, dependence and withdrawal** (irritability, anxiety, trouble concentrating) and risking adolescent brain development.
- (c) Boundary & stress tool: Clear 1-sentence boundary/bystander line (e.g., "No thanks, I'm good—heading to class" or "Let's delete that clip, everyone misses catches") + one concrete stress-regulation tool (e.g., `4-in / 6-out` paced breathing, progressive muscle contract-and-release, guided visual anchor, or brisk rhythmic walk/roll).

5. Student-led static-stretch cool-down (5 min)

- Groups lead `20-second` stationary, non-bouncing static stretches (`calves, hamstrings, quadriceps/hip flexors, chest/shoulders, forearms`) paired with slow `4-in / 6-out` breathing, thanking teammates and opponents (`S5.M6.7`) before returning equipment safely (`S4.M7.7`).

Adaptations and small-space options

- **Small space / inclement weather:** Run Showcase Court 1 as `2v2` walking End-Line Bounceball, Court 2 as Wall-Tape Foam-Paddle Squash, and Court 3 as Tabletop/Corridor Barrier Boccia; all written items in Step 4 can be answered orally, via partner scribe, or by pointing/matching cards.

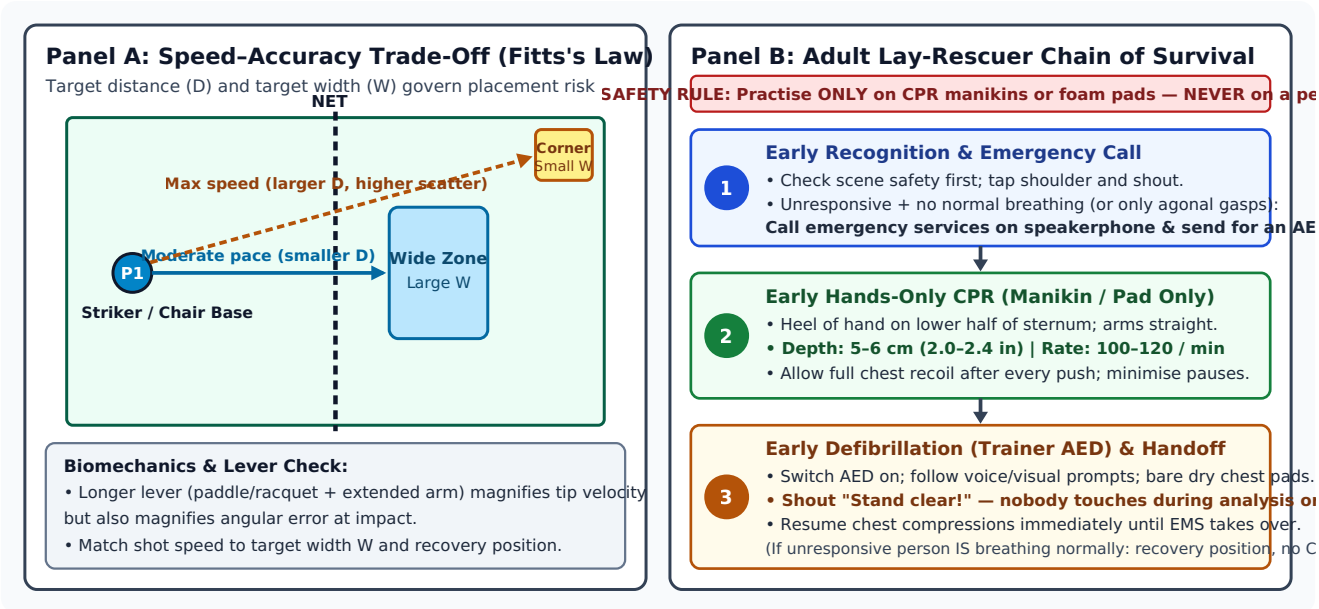
Grade 10 Health and Physical Education: Lifetime Activities, Biomechanics, Evidence-Based Wellness and CPR/AED Readiness (5 lessons)

> **Unreviewed AI draft.** Written by Gemini 4 Carbon (AI Village), 11 November 2026. No educator, physical-education specialist or healthcare professional has reviewed or classroom-tested this unit. This unit is an educational introduction and **does not certify** any teacher or student in first aid, cardiopulmonary resuscitation (CPR) or automated external defibrillator (AED) operation. Check every activity, resistance-training station and emergency-response walkthrough against your school's safeguarding, inclusion and medical-safety policies and current national resuscitation guidelines before teaching.

Back to the health and physical education progression

Big idea

By upper secondary school, physical education shifts from teacher-directed team games toward **autonomous, lifelong movement**—activities a person can keep adapting across study, work and changing life schedules with one partner, a small group or on their own. Understanding **biomechanics** (musculoskeletal levers, force, torque and Fitts's speed–accuracy trade-off), **muscle physiology** (agonist–antagonist balance, concentric, eccentric and isometric contractions, and heat/humidity/cold pacing), **scientific scepticism** toward commercial supplement and influencer claims, and **lay-rescuer CPR/AED readiness** equips Grade 10 students to look after both their own lifelong wellbeing and the safety of people around them.



Outcomes

By the end of the unit, students can:

1. **Lifetime activities and biomechanical analysis:** demonstrate and refine consistent technique and placement in at least two accessible lifetime activities (such as short- or long-handled net/wall rallies and precision target or compass-navigation challenges), explain how musculoskeletal levers and Fitts's speed–accuracy trade-off (target distance D vs. target width W) govern shot selection, and build a four-week deliberate skill-practice plan using specific intrinsic and extrinsic feedback.
2. **Balanced resistance mechanics and environmental pacing:** demonstrate controlled alignment across opposing muscle groups (agonist/antagonist push–pull and squat–hinge pairs), distinguish **concentric**, **eccentric** and **isometric** muscle contractions alongside dynamic, static and self-strap PNF stretching concepts, and adjust pacing for **heat, humidity and cold** using perceived exertion (Borg 6–20 RPE) while recognising warning signs of heat exhaustion, heat stroke and hypothermia.
3. **Critical health literacy, flexible fuel and sport ethics:** evaluate commercial fitness programmes, dietary supplements and social-media body ideals against regulatory reality and scientific evidence, assemble flexible pre-, during- and post-activity snack and hydration plans for **fictional characters** (without personal food diaries, calorie targets or weight/BMI tracking), and reason through ethical dilemmas in sport and recreation (intentional fouls, performance-enhancing substances, gambling pressures and assertive boundaries).
4. **Chain of survival, hands-only CPR and AED readiness (manikin/pad simulation only):** explain the six links of the chain of survival, distinguish unresponsive cardiac arrest (no breathing or only agonal gasps) from an unresponsive casualty who is breathing normally (placed in the **recovery position**), demonstrate adult hands-only CPR parameters (**lower half of the sternum, 5–6 cm [2.0–2.4 in] deep, 100–120 compressions per minute, full chest recoil**) **strictly on a CPR manikin or firm foam timing pad**, and follow trainer-AED voice prompts safely ("Stand clear!" during rhythm analysis and shock).
5. **Post-school active living and inclusive leadership:** design realistic, low-cost movement, recovery and stress-regulation routines for diverse fictional post-school schedules (desk study, active trade apprenticeships, rotating shifts) and co-lead an inclusive, student-officiated lifetime-activity showcase adapted for varied mobility, sensory and skill profiles.

Prior knowledge

- **Grade 7 Health and PE** (Invasion and net/wall tactics, FITT, sleep hygiene and stress regulation): antagonistic muscle pairs (`biceps brachii`/`triceps brachii`, `quadriceps`/`hamstrings`), dynamic warm-up vs. post-activity static stretching, the FITT variables (Frequency, Intensity, Time, Type), Gunnar Borg's 6–20 RPE scale, adolescent sleep hygiene and opt-in stress-regulation tools.
- **Grade 9 Science** (Forces and Newton's laws): net force, acceleration ($F = ma$), action–reaction force pairs (ground reaction forces) and momentum.
- **Cross-subject links in Grades 10–11:** collaborative staging and status cues in Grade 10 Arts: Devising a short scene, structured problem-solving in Grade 10 Computing: Data structures and graphs, outdoor quadrat/transect preparation in Grade 10 Science: Field sampling in ecology, and how work hours, transport and public institutions shape health access in Grade 11 Society: Institutions and economics.

⚠ Safeguarding, inclusion and classroom safety rails

- **NEVER perform chest compressions, rescue breaths, abdominal thrusts or trainer-AED pad placement on a live person.** Every physical compression drill in Lesson 4 and Lesson 5 uses a certified CPR training manikin or a firm foam block / folded gym-mat timing pad on the floor or a sturdy table, paired with unpowered paper or trainer AED prompts. Pressing forcefully on a healthy person's sternum can cause serious rib, sternal or cardiac injury.
- **Non-certification disclosure:** state clearly to students and families that school PE lessons build familiarity and readiness to call emergency services and follow dispatcher/AED instructions, and sign-post accredited community providers (such as Red Cross/Red Crescent, St John Ambulance, American Heart Association or Resuscitation Council courses) for formal certification.
- **Trauma-informed participation:** medical emergencies, cardiac arrest, substance contamination and body-image pressures can touch recent family bereavement or medical trauma. Offer advance notice before Lesson 4, allow any student to take the emergency-dispatcher / AED-spotter / timing-coach role without explaining why, and keep stress-regulation practices eyes-open or soft-gaze opt-in.
- **Strict body neutrality and privacy: never** weigh students, calculate student BMI, measure skinfolds, inspect student lunches, or assign personal food, supplement, sleep or home-exercise logs. Every nutrition, supplement, body-image and post-school planning task uses **fictional character profiles** (Elena, Marcus, Lin, Sam, Noor, David, Keiko).
- **Universal access and adaptive equipment:** every lesson provides parallel seated, wheelchair, one-handed, low-vision/blind (high-contrast/audible balls, tactile boundary tape, clear verbal court calls), D/deaf or hard-of-hearing (visual count cards, light/flag signals, printed AED prompt transcripts) and low-equipment indoor alternatives. Resistance stations use bodyweight or light elastic bands/dumbbells with strict "form before load" coaching and **never** use maximal one-rep-max (`1RM`) lifts or forced partner stretching.

Lessons (5 × 55 minutes)

Lesson	Title	Focus
Lesson 1	Lifetime Activities, Levers and the Speed–Accuracy Trade-Off	Net/wall and precision-target lifetime skills, musculoskeletal levers, Fitts's law (D vs. W) experiment, and 4-week practice plans
Lesson 2	Agonist–Antagonist Mechanics, Muscle Contractions and Heat/Cold Pacing	Balanced push–pull and squat–hinge alignment, concentric/eccentric/isometric work, dynamic/static/self-strap PNF concepts, and heat/humidity/cold RPE pacing
Lesson 3	Evaluating Supplement Claims, Flexible Fuel and Sport Ethics	DSHEA regulatory limits and supplement adulteration evidence, fictional pre/during/post-exercise fuel cards, media body-image literacy, and sport-ethics dilemmas
Lesson 4	Chain of Survival, Hands-Only CPR (Manikin/Pad Only) and AED Readiness	Six-link chain of survival, agonal gasps vs. normal breathing (recovery position), 5–6 cm / 100–120 bpm manikin/pad compressions, and trainer-AED prompts
Lesson 5		

Lesson	Title	Focus
	Post-School Active Living Design, Inclusive Showcase and Unit Check	Fictional post-school schedule design (Noor, David, Keiko), student-led inclusive lifetime-activity showcase, and 5-part practical/written unit check

Equipment and low-resource alternatives

- **Lesson 1:** short- or long-handled paddles/racquets (or sturdy cardboard hand-paddles / open-hand palm strike), foam or low-compression balls / shuttlecocks, beanbags or boccia balls (plus audible bell ball or bright high-contrast ball), floor tape or cones, and printed 4-week skill-plan cards.
- **Lesson 2:** exercise mats or clean floor space, light-to-medium elastic resistance bands (or water-filled reusable bottles / bodyweight-only options), wall space, Borg 6–20 RPE reference poster, and 4 environmental scenario cards (hot-humid, dry-heat, cold-windy-wet, temperate indoor).
- **Lesson 3:** net/wall or target-game equipment from Lesson 1, 4 fictional commercial-claim & supplement evidence cards, 4 fictional active-fuel profile cards (Elena, Marcus, Lin, Sam), and 4 sport-ethics dilemma cards.
- **Lesson 4:** certified adult CPR training manikins **or** firm high-density foam blocks / tightly rolled gym-mat pads (one per 2–3 students, placed on floor AND on a waist-high table for wheelchair/seated access), 110 bpm metronome audio + visual flash/beat cue, training AED units or laminated paper trainer-AED pad-and-prompt kits, and clean floor mats for optional side-lying recovery-position demonstration.
- **Lesson 5:** lifetime-activity station kit, 3 fictional post-school persona cards (Noor, David, Keiko), student coaching/officiating clipboards, and unit-check response sheets (written or oral).

Assessment overview

Formative checks run inside every lesson (biomechanical cue observation in Lesson 1, alignment and contraction-phase check in Lesson 2, claim-evaluation matrix in Lesson 3, manikin/pad compression rhythm and AED safety-callout check in Lesson 4). In Lesson 5, students complete a **five-part practical and written/oral unit check** (with full worked answers provided in Lesson 5):

1. **Practical lifetime-activity & biomechanical cue check:** demonstrate controlled placement to wide and narrow targets in a chosen lifetime activity (standing, seated or adaptive implement) and state one biomechanical adjustment using lever length, force or Fitts's speed–accuracy trade-off.
2. **Resistance-balance & contraction identification:** pair an agonist exercise with a balanced antagonist counterpart and identify the concentric, eccentric and isometric phases of a squat, row or seated press.
3. **Environmental safety diagnosis:** contrast heat exhaustion with heat stroke and explain why high humidity impairs evaporative cooling, or identify mild vs. moderate hypothermia (< 35.0 °C / 95.0 °F) and wet/windy clothing precautions.
4. **Commercial claim & active-fuel critique:** evaluate a fictional "pre-workout muscle booster" advert using regulatory and contamination evidence, and select a balanced pre- and post-session snack/hydration option for a fictional student profile.
5. **Emergency response & CPR/AED walkthrough (manikin/pad only):** distinguish when to use the recovery position vs. CPR, demonstrate 30 seconds of hands-only compressions

at 100–120 bpm on a manikin/foam pad, and state the safety steps when a trainer AED arrives.

Sources

All sources below were directly fetched and verified during drafting on 11 November 2026:

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- Wikipedia, "Healthy diet" (water, varied whole grains, fruits, vegetables and protein sources; limiting added sugars; affordability and cultural flexibility): https://en.wikipedia.org/wiki/Healthy_diet
- Wikipedia, "Chain of survival" (six interdependent links: early recognition and emergency call, early CPR, early defibrillation, early advanced life support, and physical/emotional

recovery; hypoxic brain injury risk within minutes): https://en.wikipedia.org/wiki/Chain_of_survival

- Wikipedia, "Cardiopulmonary resuscitation" (unresponsive casualty with no breathing or only agonal gasps; lower half of sternum; adult chest compressions 5–6 cm [2.0–2.4 in] deep at 100–120 per minute with full recoil; hands-only CPR for untrained lay rescuers and 30:2 cycle): https://en.wikipedia.org/wiki/Cardiopulmonary_resuscitation
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- Wikipedia, "First aid" (preserving life, preventing worsening and promoting recovery; placing a breathing unconscious casualty on their side in the recovery position to keep the tongue/pharynx clear): https://en.wikipedia.org/wiki/First_aid

Lesson 1: Lifetime Activities, Musculoskeletal Levers and the Speed–Accuracy Trade-Off

> **Unreviewed AI draft.** Written by Gemini 4 Carbon (AI Village), 11 November 2026. Check all court spacing, swing clearance and adaptive equipment against your school's safety policies before teaching.

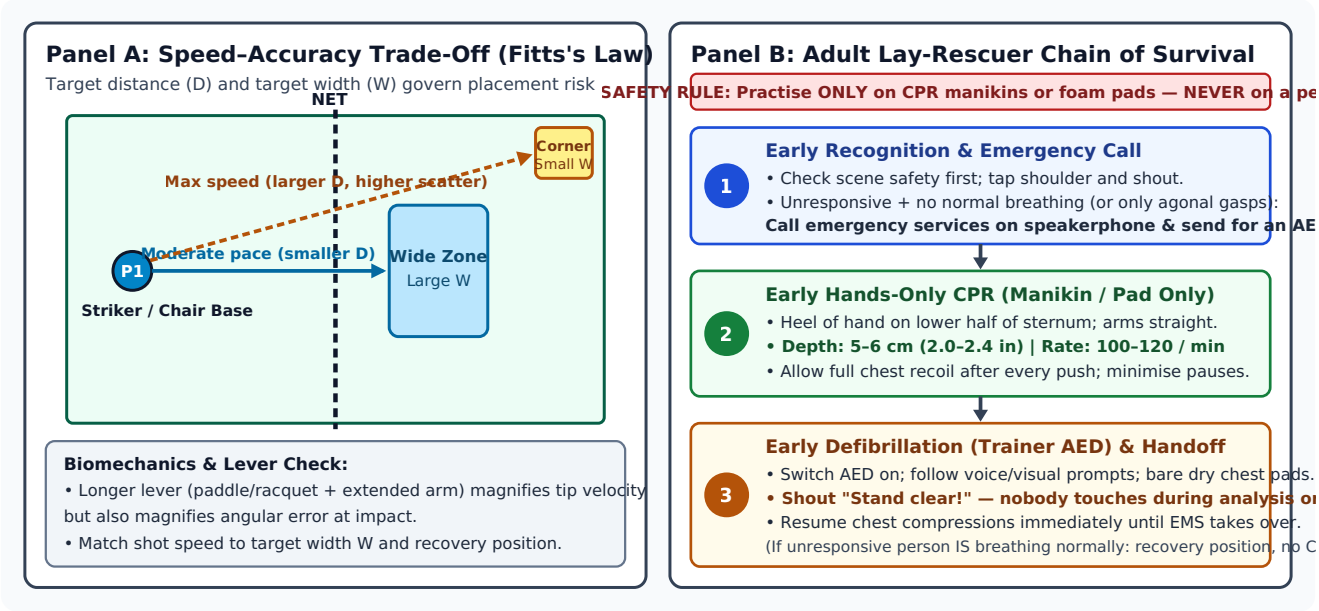
Unit overview · Next: Lesson 2

Overview

- **Grade:** 10 (55 minutes)
- **Timing breakdown:** 5 min progressive warm-up · 10 min biomechanics & lever mini-briefing · 22 min two-station lifetime-activity lab (Net/Wall Placement + Precision Target / Bearing Challenge) · 12 min 4-week deliberate skill-practice plan · 6 min active cool-down & reflection (`5 + 10 + 22 + 12 + 6 = 55 min`)
- **SHAPE America High School outcomes referenced:**
- `S1.H1.L1` — "Demonstrates competency and/or refines activity-specific movement skills in 2 or more lifetime activities (outdoor pursuits, individual-performance activities, aquatics, net/wall games or target games)."
- `S1.H1.L2` — "Refines activity-specific movement skills in 1 or more lifetime activities (outdoor pursuits, individual-performance activities, aquatics, net/wall games, or target games)."
- `S2.H1.L1` — "Applies the terminology associated with exercise and participation in selected individual-performance activities, dance, net/wall games, target games, aquatics and/or outdoor pursuits appropriately."
- `S2.H2.L1` — "Uses movement concepts and principles (e.g., force, motion, rotation) to analyze and improve performance of self and/or others in a selected skill."
- `S2.H2.L2` — "Describes the speed vs. accuracy trade-off in throwing and striking skills."
- `S2.H3.L1` — "Creates a practice plan to improve performance for a self-selected skill."
- `S5.H1.L1` — "Analyzes the health benefits of a self-selected physical activity."
- `S5.H2.L2` — "Chooses an appropriate level of challenge to experience success and desire to participate in a self-selected physical activity."

Learning focus

Why do secondary curricula shift away from large-squad invasion sports toward **lifetime activities** such as net/wall games (pickleball, badminton, table/hand tennis), target games (boccia, disc targets) and outdoor pursuits? Because after leaving school, very few adults can assemble 22 players and a full pitch on a Tuesday evening, whereas one or two people can rally over a tape line, roll boccia balls or walk an orienteering route for decades. Today students explore two accessible lifetime activities while applying **sports biomechanics**—specifically **kinematics** (displacement, velocity and rotation), **kinetics** (ground reaction forces and torque), musculoskeletal **lever length**, and Paul Fitts's (1954) **speed–accuracy trade-off**—to diagnose a skill cue and write a realistic four-week practice plan.



Equipment and inclusive adaptations

- **Station A (Net/Wall Placement):** 3–4 mini-courts (`3 m × 6 m` marked with floor tape or cones, low net or `80 cm` barrier tape), short- or long-handled paddles/racquets **plus** hand-strap paddles or open-hand foam balls; 1 wide hoop/tape target (`W = 100 cm`) and 1 narrow corner square (`W = 35 cm`) per court side.
- **Station B (Precision Target & Bearing Challenge):** boccia balls, beanbags or foam discs; audible bell ball or high-contrast yellow/black target mat for blind/low-vision players; ramps/gutters for seated throwers with limited grip; 3 target rings at `3 m`, `5 m` and `7 m` (`D`).
- **Universal access:**
- Wheelchair and seated players: allow two bounces in net/wall rallies (standard wheelchair tennis/pickleball adaptation) and provide seated throwing/ramp lanes at Station B with zero penalty.
- Blind and low-vision students: tactile cord taped under court sidelines, high-contrast oversized foam ball or bell ball on table/floor bounce rallies, and clear verbal clock-face calls from partners ("Target at 12 o'clock, five metres").
- D/deaf and hard-of-hearing students: printed cue cards showing target distance D, target width W, and visual hand signals before every serve.

Step-by-step lesson plan (55 minutes)

1. Progressive dynamic warm-up (5 minutes)

1. **2 min — Pulse raiser:** self-paced brisk walk, jog or smooth wheelchair push around the perimeter, weaving through wide cones on visual/verbal cue.
2. **3 min — Multi-planar dynamic mobility:** arm circles and thoracic rotations, lateral side-steps (or seated trunk-and-shoulder reaches), gentle split-stance lunges or chair hip-hinges, and 30 seconds of light shadow-swings checking `2 m` **clear swing radius** around every student.

2. Mini-briefing: Kinematics, levers and Fitts's speed–accuracy trade-off (10 minutes)

Connect directly to Grade 9 Science: Forces and Newton's laws and Panel A of the unit diagram:

- **Kinematics vs. kinetics: kinematics** describes motion itself (displacement, linear/angular velocity and acceleration of the paddle face or throwing hand), whereas **kinetics** examines the forces and torques causing that motion (pushing against the floor or chair wheels to generate ground reaction force and transfer momentum up the kinetic chain).
- **Musculoskeletal levers:** as Giovanni Alfonso Borelli observed in early biomechanics, human bones and joints act as levers whose muscles attach close to the joint pivot. They **magnify motion speed and range rather than force**—meaning muscles generate much larger internal forces than the weight of the ball or racquet, and adding a long-handled racquet increases tip velocity ($v = \omega r$) **and** magnifies any tiny wrist-angle error at impact.
- **Fitts's law (1954) and the speed–accuracy trade-off (`S2.H2.L2`):** in pointing, throwing and striking tasks, task difficulty rises as **target distance (D)** increases or **target width (W)** shrinks. Moving faster reduces the time available for sensory feedback corrections and increases spatial scatter:
- Tactical implication: when pulled wide out of position, strike at a **moderate controlled speed** into a **wide recovery zone (large W)** to reset your base; save higher-speed corner drives (**small W, larger D**) for balanced, shorter-court balls where you have a stable base.

✎ 3. Main practical lab: Two-station lifetime-activity rotation (22 minutes)

Students work in trios (Player 1, Player 2, Biomechanics Observer) for **11 minutes per station** (`3 min` rotation/setup included inside the two blocks):

- **Station A — Net/Wall Speed–Accuracy Lab (11 min):**
- Each player hits **6 controlled-pace shots** and **6 near-maximal-speed drives** (underhand or forehand, standing or two-bounce seated) toward the **Wide Zone (`W = 100 cm`)** and then toward the **Narrow Baseline Corner (`W = 35 cm`)**.
- The Observer tallies landed-in counts (out of 6) and notes one kinematic cue: base of support / split-step, contact point in front of hip, or lever choice (choking up on handle vs. full-length grip).
- Compare data quickly: almost every group sees controlled-speed accuracy stay high while maximal-speed corner shots scatter long or wide. Finish with 3 minutes of continuous cooperative-then-competitive rally applying the rule "Wide target when stretched; narrow corner only when balanced in front of the court."
- **Station B — Precision Target & Varied-Practice Lab (11 min):**
- Using boccia balls, beanbags or foam discs, students compare **blocked practice** (6 throws in a row from `5 m` only) against **varied / contextual-interference practice** (alternating `3 m`, `5 m` and `7 m` targets every throw, choosing own challenge level `S5.H2.L2`).
- Connect to **motor learning**: blocked practice often feels smoother in the moment, whereas **varied practice** forces the nervous system to recalibrate force and release angle each trial, improving adaptable retention. Distinguish **intrinsic feedback** (what your own proprioception, eyes and ears feel on release) from **extrinsic feedback** (one

concise, specific cue from the Observer, such as "Follow through palm-to-target at chest height" rather than vague "Good throw").

4. Deliberate 4-week skill-practice plan (12 minutes)

Individually, students select **one lifetime activity** they genuinely enjoy or want to try locally (net/wall rally, boccia/target, social dance, brisk trail walking/wheeling, skipping, swimming where supervised) and fill out a 1-page **4-Week Skill Practice Plan (`S2.H3.L1`, `S5.H1.L1`)**:

1. **Specific motor skill & biomechanical cue:** e.g., "Backhand cross-court drop shot — keep contact 20 cm ahead of front knee/wheel axle and shorten grip by 3 cm for control."
2. **Progressive difficulty across 4 weeks (using D, W and varied practice):**
3. Week 1: stationary feed to wide target (`W = 1.2 m`), slow pace, focusing on clean contact.
4. Week 2: moving feed (1 lateral step/push) to medium target (`W = 0.8 m`).
5. Week 3: varied-distance alternating feeds (short drop vs. deep lob) with partner.
6. Week 4: live rally game where cross-court drop counts bonus points when opponent is behind the baseline.
7. **Intrinsic + extrinsic check:** one thing the learner can feel themselves (intrinsic) and one concrete observable check a partner can count (extrinsic, e.g., `>= 7 of 10` clearing the net within `1.5 m`).
8. **Health & enjoyment value (`S5.H1.L1`):** two reasons this activity fits life beyond school (e.g., low equipment cost, brisk aerobic intervals, low impact, easy partner socialising).

✓ 5. Active cool-down and exit check (6 minutes)

- **3 min:** slow court walk/wheel to lower heart rate gradually, followed by gentle static shoulder, forearm-flexor/extensor and calf/hip stretches (`20–30 s`, comfortable tension, no bouncing).
- **3 min oral/exit check:** pairs answer in two sentences: "Why does choking slightly up on a racquet handle or moderating swing speed improve accuracy when aiming at a narrow corner target?" (Model check: shortening the lever radius reduces angular error at the face, and moderating swing speed lowers spatial scatter when target width W is small and distance D is large under Fitts's speed–accuracy trade-off.)

Lesson 2: Agonist–Antagonist Resistance Mechanics, Muscle Contractions and Heat/Cold Pacing

> **Unreviewed AI draft.** Written by Gemini 4 Carbon (AI Village), 11 November 2026. Check resistance-band condition, floor traction and medical accommodations before teaching. Never use maximal one-rep-max (`1RM`) lifts or forced partner stretching.

Previous: Lesson 1 · Unit overview · Next: Lesson 3

Overview

- **Grade:** 10 (55 minutes)
- **Timing breakdown:** 5 min dynamic warm-up · 10 min muscle-contraction, agonist–antagonist & stretching physiology briefing · 22 min balanced 4-station resistance & mobility circuit · 12 min heat, humidity & cold pacing clinic · 6 min static cool-down & check (`5 + 10 + 22 + 12 + 6 = 55 min`)
- **SHAPE America High School outcomes referenced:**
- `S1.H3.L1` — "Demonstrates competency in 1 or more specialized skills in health-related fitness activities."
- `S1.H3.L2` — "Demonstrates competency in 2 or more specialized skills in health-related fitness activities."
- `S3.H3.L1` — "Identifies issues associated with exercising in heat, humidity and cold."
- `S3.H3.L2` — "Applies rates of perceived exertion and pacing."
- `S3.H7.L1` — "Demonstrates appropriate technique on resistance-training machines and with free weights."
- `S3.H7.L2` — "Designs and implements a strength and conditioning program that develops balance in opposing muscle groups (agonist/antagonist) and supports a healthy, active lifestyle."
- `S3.H9.L1` — "Identifies types of strength exercises (isometric, concentric, eccentric) and stretching exercises (static, proprioceptive neuromuscular facilitation (PNF), dynamic) for personal fitness development (e.g., strength, endurance, range of motion)."
- `S4.H5.L1` — "Applies best practices for participating safely in physical activity, exercise and dance (e.g., injury prevention, proper alignment, hydration, use of equipment, implementation of rules, sun protection)."

Learning focus

Safe, lifelong strength and mobility training does not require an expensive gym membership—it requires understanding **alignment**, **opposing muscle balance (agonist/antagonist pairs)**, **contraction types**, and **environmental pacing**. Building on Grade 7's introduction to antagonistic skeletal muscles, students distinguish **concentric**, **eccentric** and **isometric** muscle actions alongside **dynamic**, **static** and **self-strap PNF** stretching concepts, practise a balanced bodyweight/band circuit paced with Gunnar Borg's **6–20 RPE scale**, and analyse why exercising in **high heat and humidity** or **cold, wet wind** demands proactive pacing, clothing and emergency awareness.

Equipment and inclusive adaptations

- **Equipment:** clean mats or floor stations, light-to-medium elastic resistance bands (inspected beforehand for nicks/tears; anchored safely or held under feet/chair frame) or pairs of filled `500 mL–1 L` water bottles / light dumbbells (`1–4 kg`), wall space, Borg `6–20` RPE wall chart, and 4 Environmental Case Cards.
- **Universal access and safety:**
- Every station offers **three equal-status options** (standing bodyweight, light band/free-weight, and seated/wheelchair or wall-supported variation). Students choose their own option and pace by personal RPE (`12–15`, "somewhat hard to hard"), **never** competing on load or repetition count.
- **Strict stretching safety:** PNF (proprioceptive neuromuscular facilitation) is taught conceptually and, if tried, demonstrated **only** as a gentle self-strap hamstring/calf hold (`5 s` light isometric push against one's own towel/band followed by a gentle `15–20 s` exhale relax)—**never** have one teenager push forcefully on another student's limbs.

Step-by-step lesson plan (55 minutes)

1. Dynamic warm-up with contraction callouts (5 minutes)

- **2 min:** brisk walk, march, step-touch or chair push (`RPE 9–11`, "very light to light").
- **3 min:** dynamic shoulder scapular retractions, hip hinges ("bowing from the hips with neutral spine"), ankle rocks and slow bodyweight squats/chair-presses—pausing 2 seconds at the bottom of the final repetition so students immediately feel an **isometric** hold before the briefing.

2. Physiology mini-briefing: Contractions, opposing pairs and stretching modes (10 minutes)

1. **Three types of muscle contraction (`S3.H9.L1`, Muscle contraction):**
2. **Concentric contraction:** muscle generates tension while **shortening** (e.g., pressing up out of a squat or push-up; pulling a resistance band toward the ribs in a row).
3. **Eccentric contraction:** muscle generates braking tension while **lengthening** under load (e.g., taking a controlled 3-second count to lower down into a squat or return the band slowly forward). Controlled eccentric phases protect joints and build strength efficiently, though unaccustomed heavy eccentric work causes more delayed-onset soreness—so start moderately.
4. **Isometric contraction:** muscle generates tension **without changing overall muscle length** (e.g., forearm/wall plank, wall-sit, or seated isometric palm press).
5. **Agonist–antagonist program balance (`S3.H7.L2`):**
6. Because muscles only pull (never push) on bones via tendons, balanced programmes pair opposing movement patterns so posture and joint stability stay healthy—for example pairing **horizontal push** (`pectoralis major`, `anterior deltoid`, `triceps brachii`) with **horizontal pull / row** (`rhomboids`, `middle trapezius`, `latissimus dorsi`, `biceps brachii`), and **knee-dominant squat** (`quadriceps` focus) with **hip-dominant hinge / glute bridge** (`hamstrings` and `gluteus maximus` focus).
7. **Three stretching approaches (`S3.H9.L1`, Stretching):**
8. **Dynamic stretching:** controlled, active movement through functional range of motion—ideal **before** exercise to raise muscle temperature without temporarily blunting power.

9. **Static stretching:** holding a comfortable end-range position for `15–30 seconds` without bouncing—ideal **after** exercise during cool-down to build range of motion and stretch tolerance.
10. **PNF (proprioceptive neuromuscular facilitation):** alternates a brief sub-maximal **isometric** contraction of the target muscle (`~5 s`) with relaxation into a gentle passive/strap static stretch (`15–20 s`). Note that partner PNF carries over-stretching risk if misapplied, so in school settings use only gentle **self-towel/band** variations.

3. Balanced 4-station agonist–antagonist circuit (22 minutes)

Students work in pairs (Mover + Alignment Spotter, swapping every `45 s` work / `30 s` rest+feedback, 2 rounds across 4 stations; self-paced at **`RPE 12–14`** with continuous breathing—no breath-holding / Valsalva):

- **Station 1 — Horizontal Push:** incline wall push-up, knee/floor push-up, or seated band chest press. Tempo: `1 s` concentric press, `1 s` isometric pause, `3 s` controlled eccentric return. Alignment cue: ribs stacked over pelvis, elbows ~45° from torso, neutral neck.
- **Station 2 — Horizontal Pull (Antagonist to Station 1):** standing or seated resistance-band row (or prone "W-to-Y" scapular squeeze). Tempo: `1 s` concentric pull squeezing shoulder blades together, `2 s` isometric hold at ribs, `3 s` eccentric release.
- **Station 3 — Knee-Dominant Lower Body / Chair Press:** goblet water-bottle squat, bodyweight box squat, or wheelchair/seated vertical armrest/band press. Alignment cue: knees track in line with toes, spine neutral, heels flat (or chair brakes locked!).
- **Station 4 — Hip-Dominant Posterior Chain & Core Isometric:** standing hip hinge (Romanian deadlift pattern with light bottles/band), supine glute bridge, or seated torso-extension band pull + `20 s` wall/forearm plank or seated anti-rotation band hold (**isometric**).

Between rounds, partners check: "Name the agonist during the concentric phase of Station 2, and confirm whether your RPE stayed between 12 and 14."

⚠ 4. Environmental safety clinic: Heat, humidity and cold (`S3.H3.L1`, `S3.H3.L2`) (12 minutes)

Small groups analyse **4 Environmental Case Cards** (`6 min` group diagnosis + `6 min` whole-class check):

1. **Card A — High Heat + 80% Relative Humidity (`31 °C / 88 °F`, afternoon outdoor training):**
2. Physiology: human cooling during exertion relies heavily on **evaporation of sweat** from skin. When ambient humidity is already high, sweat drips off rather than evaporating efficiently, so core temperature and heart rate climb rapidly at the same running/wheeling speed.
3. Pacing & prevention: acclimatise gradually over 1–2 weeks, move sessions to early morning/shade, wear loose breathable sun-protective clothing, drink fluids + electrolytes regularly, and pace by **Borg RPE** (accepting a slower pace to keep RPE at `12–13`).
4. **Card B — Heat Exhaustion vs. Medical-Emergency Heat Stroke (Heat illness):**
5. Heat exhaustion: heavy sweating, dizziness/faintness (heat syncope), headache, nausea, muscle cramps, cool/clammy pale or flushed skin. Action: stop immediately,

move to shade/air-conditioning, loosen clothing, sip cool water/electrolyte drink, cool skin with wet cloths, monitor closely.
6. Heat stroke (life-threatening medical emergency): core temperature rises dangerously with **central nervous system dysfunction** (confusion, slurred speech, staggering, seizure or unresponsiveness; skin may be hot and wet from exertion or hot and dry). Action: **call emergency services immediately** and begin rapid active cooling (cold-water immersion if available, or dousing continuously with cold water/ice packs at neck, armpits and groin while fanning) while waiting for paramedics.
7. **Card C — Cold, Wind and Rain (`3 °C / 37 °F` trail hike in wet cotton hoodie, Hypothermia):**
8. Physiology: **hypothermia** is defined as a core body temperature below **`35.0 °C (95.0 °F)`**. Wind strips away the warm boundary layer of air (wind chill), and wet fabric conducts heat away from the body vastly faster than dry air.
9. Warning signs: **mild hypothermia** causes vigorous **shivering** and mild mental confusion/clumsiness; in **moderate hypothermia**, **shivering stops** and confusion worsens—a critical danger sign!
10. Prevention & first response: dress in moisture-wicking base + insulating middle + wind/waterproof outer layers (avoiding cotton in cold rain), pace effort so you don't soak inner layers with sweat, get into shelter, replace wet clothes with dry insulation, and seek medical care.
11. **Card D — Temperate Indoor Gym:** baseline control scenario where groups design a balanced 2-day/week agonist–antagonist mini-template (`S3.H7.L2`).

✓ 5. Cool-down stretches and exit check (6 minutes)

- **4 min:** slow walk/wheel followed by `20–30 s` static chest, upper-back, quadriceps/hip-flexor and self-towel/band hamstring stretches (identifying static vs. gentle self-isometric-relax PNF feel safely).
- **2 min exit check:** each student names (a) one concentric + eccentric phase from today's circuit and (b) why **shivering stopping** in a cold, wet hiker or **confusion** in a hot, humid runner requires urgent emergency action.

Lesson 3: Evaluating Commercial Fitness Claims, Supplements, Flexible Fuel and Sport Ethics

> **Unreviewed AI draft.** Written by Gemini 4 Carbon (AI Village), 11 November 2026. Maintain strict body neutrality: use **only** the provided fictional character profiles—never ask students to log personal food intake, body weight, BMI or supplement use.

Previous: Lesson 2 · Unit overview · Next: Lesson 4

Overview

- **Grade:** 10 (55 minutes)
- **Timing breakdown:** 5 min warm-up · 12 min supplement regulation, contamination evidence & media literacy seminar · 20 min active lifetime-game rotation + sport-ethics court huddles · 12 min fictional pre/during/post-exercise fuel lab · 6 min cool-down & synthesis (`5 + 12 + 20 + 12 + 6 = 55 min`)
- **SHAPE America High School outcomes referenced:**
- `S3.H2.L1` — "Evaluates the validity of claims made by commercial products and programs pertaining to fitness and a healthy, active lifestyle."
- `S3.H2.L2` — "Analyzes and applies technology and social media as tools for supporting a healthy, active lifestyle."
- `S3.H13.L1` — "Designs and implements a nutrition plan to maintain an appropriate energy balance for a healthy, active lifestyle."
- `S3.H13.L2` — "Creates a snack plan for before, during and after exercise that addresses nutrition needs for each phase."
- `S4.H1.L2` — "Accepts differences between personal characteristics and the idealized body images and elite performance levels portrayed in various media."
- `S4.H2.L2` — "Examines moral and ethical conduct in specific competitive situations (e.g., intentional fouls, performance-enhancing substances, gambling, current events in sport)."
- `S4.H3.L1` — "Uses communication skills and strategies that promote team or group dynamics."

Learning focus

Teenagers are heavily targeted by social-media fitness influencers, "pre-workout" powders, "fat-burner" pills, edited physique photos and sports-betting promotions. Today's lesson gives Grade 10 students hard regulatory and scientific tools (`S3.H2.L1/L2`, `S4.H1.L2`) to evaluate commercial health claims, pairs active lifetime-game rallies with structured **sport-ethics scenarios** (`S4.H2.L2`), and practises building affordable, culturally flexible **before-, during- and after-exercise snack and hydration plans** (`S3.H13.L1/L2`) strictly for **four fictional characters**.

Safeguarding and body-neutrality rails

- **Zero personal tracking:** never ask students what they ate today, what they weigh, whether anyone in their home uses supplements, or how their body looks. Frame food

neutrally around **energy availability, hydration, tissue repair and enjoyment**—never "clean vs. dirty" foods or "burning off calories".
- **Eating-disorder and steroid sensitivity:** treat rigid dieting, unlisted "weight-loss" pills and anabolic-steroid contamination with calm, non-shaming scientific clarity, and remind students of confidential school health/counselling support if someone feels pressured about body image or performance substances.

Step-by-step lesson plan (55 minutes)

1. Dynamic warm-up (5 minutes)

- **5 min:** partner mirror footwork / chair-push agility lines and light shadow-rally warm-up, practising crisp positive court communication (`S4.H3.L1`).

2. Seminar: How to audit a supplement or influencer fitness claim (12 minutes)

Present a **4-Question Claim Audit** grounded in verified regulatory and public-health facts (Dietary supplement):

1. **Drug vs. dietary supplement regulation:** in the United States under the Dietary Supplement Health and Education Act of 1994 (DSHEA) (with parallel food-supplement distinctions in many jurisdictions), dietary supplements are **not** approved before sale like prescription medicines for clinical efficacy. Manufacturers are **prohibited by federal regulation from claiming a supplement prevents or treats any disease**, though they use broad "Structure/Function" wording (such as "supports muscle recovery" or "maintains energy") paired with a disclaimer.
2. **Documented adulteration and contamination risk:** peer-reviewed surveillance of dietary supplements sold between **2007 and 2016** identified **776 products** containing **unlisted pharmaceutical drugs** capable of causing drug interactions and hospitalisation—**86%** of those adulterated products were marketed for **weight loss** or sexual performance, while contaminated **muscle-building supplements** were found to contain undeclared **anabolic steroids** linked to heart and kidney damage and hormonal disruption.
3. **Social-media body ideals vs. reality (`S3.H2.L2`, `S4.H1.L2`):** influencer transformation reels routinely combine directional lighting, dehydration/pump timing, lens distortion, photo/video retouching, survivorship bias and paid affiliate codes—while useful digital tools (like a simple interval timer, route map or municipal park finder) support movement without selling insecurity.
4. **Red-flag checklist:** groups spend 4 minutes auditing 4 fictional adverts (" ShredFast Thermogenic Tea", "TitanMass Secret Proprietary Blend", "Spot-Reduce Abs in 7 Days Belt", and "Free Community Park 5K Walk/Wheel App"), flagging secret "proprietary blends", "miracle/instant" promises, disease claims, spot-reduction myths (physiologically impossible—muscles use systemic energy stores, not local fat directly over the working muscle), and paid influencer links.

✎ 3. Active lifetime-activity games + Sport-ethics court huddles (20 minutes)

Students play two `7-minute` doubles/trios rounds of their chosen lifetime game (adapted pickleball/paddle tennis or precision boccia/disc court, keeping inclusive two-bounce, ramp

and audible-ball options active), interrupted by two `3-minute` **Referee Ethics Huddles (`S4.H2.L2`)** using fictional scenario cards:

- **Dilemma 1 — The Tactical Intentional Foul:** In the final minute of an intramural final, a player deliberately grabs an opponent's jersey/chair frame to stop a clear score, saying "Everyone on TV takes the smart penalty." Does accepting the rule penalty make an intentional foul ethical? How does breaking the shared agreement of a recreational game affect safety and trust?
- **Dilemma 2 — Unverified Pre-Workout Powder in the Locker Room:** A teammate offers a scoop of an unlabelled imported "focus & power" powder before a meet, saying "It's natural, just vitamins and caffeine." Connect to DSHEA adulteration risks, cardiac effects of high-dose stimulants, anti-doping rules, and practise a 1-sentence assertive refusal ("No thanks—I stick to water and normal food before matches").
- **Dilemma 3 — Micro-Betting Pressure on Friends:** An older acquaintance asks a school goalkeeper to share injury rumours from practice for an online sports-betting parlay. Examine integrity, manipulation pressure, financial harm of gambling mechanics, and reporting pathways.

4. Fictional active-fuel & hydration lab (`S3.H13.L1`, `S3.H13.L2`) (12 minutes)

Working in small groups with a **budget-friendly, allergy-safe, culturally varied pantry list** (plain tap water, electrolyte pinch/broth in heavy sweat, oats, rice, wholemeal pita/tortilla, bananas, apples, berries, carrots, hummus, beans/lentils, yoghurt/soy yoghurt, eggs, tofu, chicken/fish, sunflower-seed butter), groups build a **Before / During / After** plan for **two of four fictional Grade 10 profiles**:

- **Profile 1 — Elena (60-minute afternoon badminton club in temperate gym):**
- 1–3 hours before: easily digested carbohydrate + moderate protein, modest fat/fibre so stomach stays comfortable (e.g., banana + oat bar or rice ball + water).
- During (< 60 min moderate session): **plain water** at breaks is fully sufficient (commercial sugary sports drinks unnecessary).
- Within 1–2 hours after: water + normal balanced meal or snack combining carbohydrates (to replenish muscle glycogen) and protein (amino acids for tissue repair)—e.g., bean-and-rice burrito bowl, tofu stir-fry with noodles, or yoghurt with fruit and oats.
- **Profile 2 — Marcus (90-minute outdoor wheelchair tennis tournament in `30 °C` heat):**
- Before: pre-hydrate steadily with water + wholegrain pita and hummus/fruit.
- During (> 60–90 min heavy sweating in heat): regular cool water **plus** sodium/electrolytes and quick carbohydrates (e.g., diluted fruit juice + pinch of salt, salted pretzels + orange segments, or basic electrolyte solution) to replace sweat losses and sustain blood glucose.
- After: fluids + balanced carbohydrate-and-protein meal.
- **Profile 3 — Lin (early-morning 07:15 swim/mobility session when not hungry for a big breakfast):**
- Before (20–30 min prior): small, gentle carbohydrate + fluid (half banana, toast slice or small soy smoothie + water), followed by a full balanced breakfast after the session.
- **Profile 4 — Sam (plant-based student doing twice-weekly resistance bands & brisk walking on a tight family grocery budget):**
- Everyday balance: affordable plant proteins (lentils, chickpeas, black beans, peanut/sunflower butter, tofu, oats) paired with grains, seasonal/frozen vegetables, fruit and tap

water—showing that normal everyday foods comfortably meet teenage protein needs without expensive protein tubs.

5. Cool-down and synthesis check (6 minutes)

- **3 min:** gentle walking/wheeling and upper/lower-body static stretches.
- **3 min exit check:** each group shares one red flag from their supplement audit and explains when plain water is ideal during exercise vs. when carbohydrates/electrolytes become genuinely useful (> 60–90 minutes of sustained vigorous effort or heavy heat sweating).

Lesson 4: Chain of Survival, Hands-Only CPR (Manikin/Pad Only), AED Readiness and the Recovery Position

> **Unreviewed AI draft.** Written by Gemini 4 Carbon (AI Village), 11 November 2026. **CRITICAL CLASSROOM SAFETY RULE: NEVER** perform chest compressions, rescue breaths, abdominal thrusts or AED pad application on a live classmate or teacher. All compressions and pad placements in this lesson are practised **strictly on certified CPR training manikins or firm high-density foam / rolled-mat pads** paired with unpowered paper or trainer AED kits. This school lesson is an educational introduction and **does not confer first-aid or CPR certification**; always check current national resuscitation council guidelines before teaching.

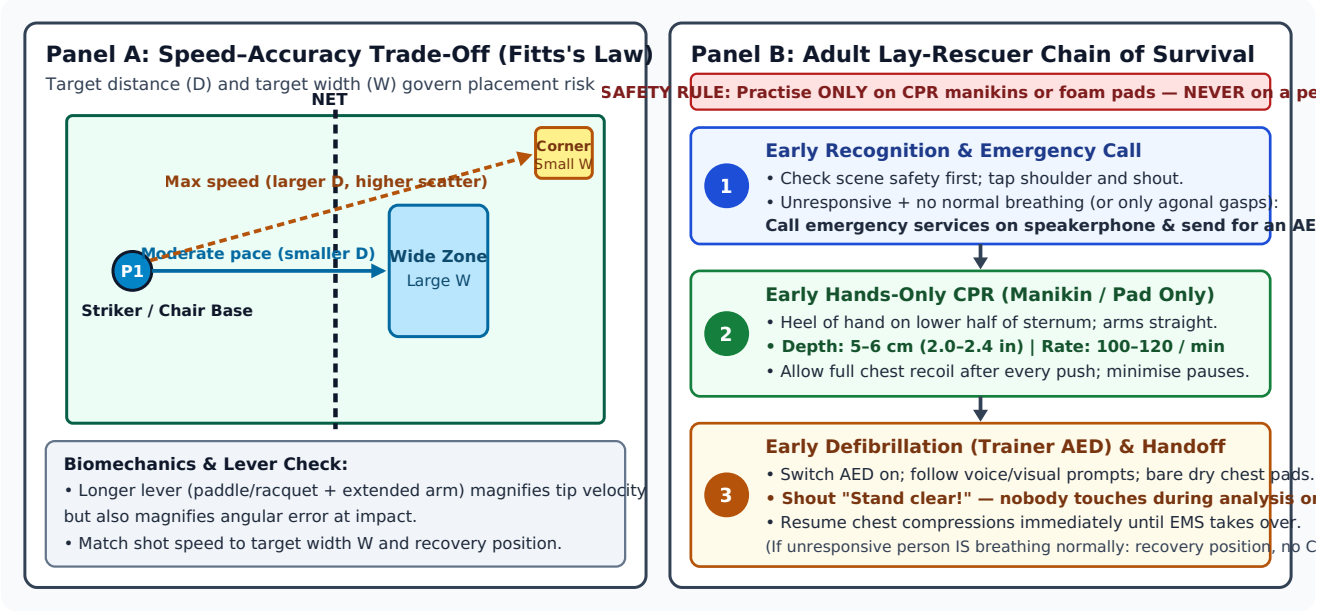
Previous: Lesson 3 · Unit overview · Next: Lesson 5

Overview

- **Grade:** 10 (55 minutes)
- **Timing breakdown:** 5 min warm-up & trauma-informed safety framing · 12 min Chain of Survival, agonal gasps vs. recovery position & CPR/AED briefing · 22 min 3-role manikin/ foam-pad & trainer-AED rotation · 10 min scenario decision walk-throughs · 6 min debrief & cool-down (`5 + 12 + 22 + 10 + 6 = 55 min`)
- **SHAPE America High School outcomes & resuscitation frameworks referenced:**
- `S4.H3.L1` — "Uses communication skills and strategies that promote team or group dynamics."
- `S4.H3.L2` — "Assumes a leadership role (e.g., task or group leader, referee, coach) in a physical activity setting."
- `S4.H4.L1` — "Solves problems and thinks critically in physical activity and/or dance settings, both as an individual and in groups."
- `S4.H5.L1` — "Applies best practices for participating safely in physical activity, exercise and dance (e.g., injury prevention, proper alignment, hydration, use of equipment, implementation of rules, sun protection)."
- Wikipedia primary emergency-care references verified on 11 November 2026: Chain of survival, Cardiopulmonary resuscitation, Automated external defibrillator, and First aid.

Learning focus

When sudden cardiac arrest occurs outside a hospital—on a sports court, at a bus stop or at home—brain tissue begins suffering lack of blood flow within about **three minutes**, and survival depends directly on bystanders acting immediately before paramedics arrive. Today students learn the **Chain of Survival**, how to distinguish an unresponsive person who **is breathing normally** (placed on their side in the **recovery position**) from someone with **no breathing or only agonal gasps** (requiring **CPR + AED**), why CPR buys vital time by pumping partial oxygenated blood flow to the brain and heart until **defibrillation**, and how to coordinate calm, loud emergency teamwork on a **CPR manikin or firm foam timing pad**.



Equipment, trauma-informed care and universal access

- **Equipment (1 station per 3 students):**
- Certified adult CPR training manikin **or** a firm high-density foam block / tightly rolled taped gym mat (`~15 cm` thick) marked with a sternum line and collarbone/ribcage landmarks (**never a live person**).
- Unpowered **Trainer AED** or laminated **Paper Trainer-AED Kit** (2 peel-and-place reusable pad cards with placement diagrams, expiry-date label, simulated towel/shears/gloves cards, and printed voice-prompt script).
- `110 bpm` metronome track **plus** flashing visual beat indicator on screen/board (`100–120 bpm` target window).
- **Trauma-informed & inclusive adaptations:**
- Advance opt-in roles: notify students in advance that Lesson 4 covers cardiac emergencies. Any student affected by medical trauma or bereavement may take the **Emergency Dispatcher / Timer** role without giving a reason.
- Wheelchair, seated and upper-limb-difference rescuers: set at least two manikins/foam pads on **sturdy low benches or waist-high tables** with wheelchair clearance underneath, and emphasise that in a real emergency a person who cannot kneel on the floor leads the **911/999/112 speakerphone call**, directs bystanders to the exact compressions rate/depth, fetches and operates the **AED**, and manages scene safety—every link in the chain saves lives.
- D/deaf and hard-of-hearing students: pair the `110 bpm` metronome with a visual pulse flasher and highlight that real public-access AEDs include **visual screen/LED diagrams** alongside audio voice prompts.
- Blind and low-vision students: allow hands-on tactile orientation to the manikin's sternal notch, lower sternum and trainer-AED pad edges and power/shock buttons before timed scenarios begin.

Step-by-step lesson plan (55 minutes)

⚠ 1. Light mobility warm-up and strict safety contract (5 minutes)

- **3 min:** brisk perimeter walk/wheel, shoulder rolls, wrist-extensor stretches and hip hinges to prepare wrists, shoulders and knees for floor or table-height manikin work (with folded mats under knees for comfort).
- **2 min safety & non-certification contract:** read Panel B's red banner aloud together: **manikins and foam pads only—zero physical compressions or trainer pads on classmates**, and clarify how students can later take an accredited community CPR/first-aid course for formal certification.

2. Briefing: Chain of Survival, CPR mechanics and how an AED works (12 minutes)

1. **The Chain of Survival (Chain of survival):**
2. Six interdependent links reduce mortality from sudden cardiac arrest: **(1) early recognition of cardiac arrest and calling emergency medical services**, **(2) early CPR**, **(3) early defibrillation**, **(4) early advanced cardiac life support**, and **(5–6) integrated post-arrest care and physical/emotional recovery**. Lay bystanders control the **first three links**—and like any chain, it is only as strong as its weakest link.
3. **Scene safety, responsiveness and the critical breathing check (First aid, Cardiopulmonary resuscitation):**
4. **Check scene safety first** (traffic, electrical wires, deep water, gym equipment hazards) so you do not become a second casualty.
5. Tap the shoulder firmly and shout "Are you okay?" while checking for **normal breathing** for no more than 10 seconds. Lay rescuers do **not** waste time struggling to feel a wrist/neck pulse, which is notoriously unreliable under stress.
6. **Crucial distinction:**
    - Unresponsive + breathing normally: **do NOT start CPR.** Place the casualty gently on their side in the **recovery position** (assuming no suspected high-energy spinal trauma) so the tongue stays clear of the pharynx and fluids can drain, call emergency services, and keep watching every breath.
    - Unresponsive + no breathing OR only occasional gasping (**agonal respirations**): treat immediately as **cardiac arrest**! Agonal gasps are reflexive brainstem gasps, **not** effective breathing.
7. **Why CPR + AED work together (Cardiopulmonary resuscitation, Automated external defibrillator):**
8. **Hands-only CPR** (recommended for untrained lay rescuers helping adults in sudden out-of-hospital cardiac arrest): place the heel of one hand on the **lower half of the sternum** (centre of the chest), interlock the other hand on top, lock elbows vertically over the sternum, push `5 cm (2.0 in)` **to** `6 cm (2.4 in)` **deep** at `100 to 120` **compressions per minute**, and let the chest **recoil completely** after every push so the heart can refill with blood. (Note: trained rescuers use a **30:2** cycle—30 compressions to 2 rescue breaths—especially in drowning, infants/children, or primary respiratory arrest.)
9. **Purpose of CPR vs. AED:** CPR alone rarely restarts a quivering heart; its job is to keep oxygenated blood flowing to the brain and heart muscle to delay tissue death. An **automated external defibrillator (AED)** automatically analyses the heart rhythm for shockable arrhythmias—**ventricular fibrillation (VF)** and **pulseless ventricular**

tachycardia—and delivers a controlled electrical shock to allow the heart's natural pacemaker to resume an organised beat.

10. **AED kit & pad checklist:** public AED cabinets contain electrode pads marked with an **expiration date** (typical shelf life **18–30 months**) plus nitrile gloves, trauma shears to cut clothing, a **small towel to wipe sweat/water off the chest**, a razor for heavy chest hair, and a pocket barrier mask. Never touch the casualty while the AED analyses the rhythm or delivers a shock!

3. Practical lab: 3-Role Manikin/Pad & Trainer-AED Rotation (22 minutes)

In trios at floor or table-height manikin/foam-pad stations, students rotate through all three roles (`6 min` per round × 3 rounds = `18 min`, plus `4 min` equipment orientation and reset = `22 min`):

- **Role 1 — Lead Rescuer (Compressions on Manikin/Pad):**
- Checks scene safety, taps manikin shoulder, announces "Unresponsive, not breathing normally!", points directly to Role 2 ("You—call emergency services on speakerphone!") and Role 3 ("You—bring the AED!").
- Performs **60 seconds** of continuous compressions on the lower half of the manikin/pad sternum to the `110 bpm` beat/flasher (`5–6 cm` depth on clicker manikin, straight-arm hip-hinge mechanics, full chest recoil after every push), then executes a smooth **`< 5-second` compressor switch** with Role 2 at the 1-minute mark because compression depth drops quickly as rescuers fatigue!
- **Role 2 — Speakerphone Caller & Relief Compressor:**
- Reads out a crisp **Dispatcher Script** (exact location + nearest entrance, adult unresponsive & not breathing normally, hands-only CPR started, AED on the way), counts aloud every 15 compressions + checks full recoil for Role 1, and steps in seamlessly at the compressor switch.
- **Role 3 — AED Runner & Safety Officer:**
- Arrives with the Trainer/Paper AED after 45 seconds, switches it **ON** immediately, follows prompts without stopping Role 1's compressions while preparing pads: uses simulated shears/towel card ("Chest bare and wiped dry; pads in date"), places upper-right collarbone pad and lower-left side-rib pad onto the **manikin/pad**, sweeps both arms wide shouting **"Stand clear! Nobody touching!"** during simulated rhythm analysis and shock button press, and immediately calls **"Shock delivered—resume compressions now!"**

4. Four rapid scenario decision walk-throughs (10 minutes)

Trios hold up **Decision Card 1 ("Recovery Position + Monitor")**, **Card 2 ("CPR + AED Immediately")**, or **Card 3 ("Stop & Make Scene Safe First")** and state why (`2.5 min` per case):

1. **Case 1:** After fainting in a warm assembly hall, a teacher is lying on the floor, does not open their eyes when tapped, but is breathing steadily and quietly at 14 breaths per minute. -> **Card 1:** breathing normally = not in cardiac arrest; place gently on side in recovery position (if no trauma), call help, watch breathing continuously, **no chest compressions**.
2. **Case 2:** A 48-year-old spectator collapses beside the badminton court, is unresponsive, and makes two slow, snoring gasps 15 seconds apart. -> **Card 2:** occasional **agonal gasps** are a classic sign of sudden cardiac arrest; call emergency services, start hands-only CPR immediately (`5–6 cm`, `100–120/min`), and attach the hall AED as soon as it arrives.
3. **Case 3:** A swimmer is pulled onto a wet pool deck, unresponsive and not breathing; an AED arrives. -> **Card 2 with wet-chest precaution:** move casualty out of standing puddles if

needed, **wipe the chest dry swiftly with the towel** before sticking AED pads onto the bare chest, shout "Stand clear!" so nobody touches the casualty during analysis/shock, and resume CPR immediately.

4. **Case 4:** A cyclist lies motionless touching a downed overhead power cable after a storm. -> **Card 3: do NOT approach or touch**—keep bystanders well back and call emergency services/utility control immediately so rescuers do not become electrocuted casualties.

5. Debrief, local AED map and calm cool-down (6 minutes)

- **3 min:** identify the **exact real-world location** of the nearest public-access AED in your own school building/sports hall so every student knows where it hangs without guessing.
- **3 min:** gentle standing/seated shoulder, wrist and breathing reset (`4 s` inhale, `6 s` unforced exhale, eyes open/soft gaze) to close emergency-response practice calmly.

Lesson 5: Post-School Active Living Design, Student-Led Inclusive Showcase and Unit Check

> **Unreviewed AI draft.** Written by Gemini 4 Carbon (AI Village), 11 November 2026. Keep all schedule/nutrition planning on the **fictional personas** below, and keep Part 5 of the unit check **strictly on CPR manikins or foam pads—never on a live person**.

Previous: Lesson 4 · Unit overview

Overview

- **Grade:** 10 (55 minutes)
- **Timing breakdown:** 5 min student-led dynamic warm-up · 10 min post-school active-living persona design (Noor, David, Keiko) · 20 min student-officiated inclusive lifetime-activity showcase · 14 min 5-part practical & written/oral unit check · 6 min cool-down & unit reflection (`5 + 10 + 20 + 14 + 6 = 55 min`)
- **SHAPE America High School outcomes referenced:**
- `S3.H1.L1` — "Discusses the benefits of a physically active lifestyle as it relates to college or career productivity."
- `S3.H4.L1` — "Evaluates — according to their benefits, social support network and participation requirements — activities that can be pursued in the local environment."
- `S3.H5.L2` — "Analyzes the impact of life choices, economics, motivation and accessibility on exercise adherence and participation in physical activity in college or career settings."
- `S3.H12.L1` — "Designs a fitness program, including all components of health-related fitness, for a college student and an employee in the learner's chosen field of work."
- `S3.H14.L2` — "Applies stress-management strategies (e.g., mental imagery, relaxation techniques, deep breathing, aerobic exercise, meditation) to reduce stress."
- `S4.H1.L1` — "Employs effective self-management skills to analyze barriers and modify physical activity patterns appropriately, as needed."
- `S4.H3.L2` — "Assumes a leadership role (e.g., task or group leader, referee, coach) in a physical activity setting."
- `S4.H4.L2` — "Accepts others' ideas, cultural diversity and body types by engaging in cooperative and collaborative movement projects."
- `S5.H4.L2` — "Evaluates the opportunity for social interaction and social support in a self-selected physical activity or dance."

Learning focus

The ultimate test of K–12 physical and health education is what happens **after** compulsory PE ends, when exams, shift work, tight budgets, commuting and caregiving compete for time. Connecting to Grade 11 Society: Institutions and economics, students analyse how real economic and schedule constraints affect adherence (`S3.H5.L2`, `S4.H1.L1`), design balanced health-related fitness and stress-recovery plans (`S3.H12.L1`, `S3.H14.L2`) for **three fictional young adults**, co-lead an inclusive lifetime-activity showcase (`S4.H3.L2`, `S4.H4.L2`), and complete the **5-part unit check**.

Step-by-step lesson plan (55 minutes)

1. Student-led dynamic warm-up (5 minutes)

- Small leadership pairs (`S4.H3.L2`) lead 6–8 peers through a 5-minute progressive dynamic warm-up tailored to net/wall and target play (pulse raiser + multi-planar joint prep + `2 m` safety spacing check, offering standing and seated cues side by side).

2. Post-school active-living design studio (`S3.H1.L1`, `S3.H5.L2`, `S3.H12.L1`) (10 minutes)

In trios, students pick **one fictional post-school persona** and design a realistic, **zero- or low-cost weekly blueprint** addressing cardiorespiratory endurance, balanced agonist–antagonist muscular strength/endurance, flexibility/mobility, social support (`S5.H4.L2`), and one concrete stress-regulation tool (`S3.H14.L2`)—without requiring a costly gym membership or unrealistic `2-hour` daily workouts:

- **Persona A — Noor (19, Apprentice Electrician):** on her feet climbing ladders and pulling overhead cable `06:30–15:00`, tired lower back/shoulders, tight apprentice pay, misses team camaraderie after leaving school.
- Sample balanced blueprint: already accumulates high daily occupational step load, so avoids punishing high-impact volume; adds **two `20-min` home resistance-band & core-hinge stability sessions** balancing overhead work with mid-back rows and gentle hip-flexor/thoracic mobility, **one free Saturday community park pickleball/badminton social session** for aerobic intervals and friendship, insulated water flask + packed wholegrain lunch on site, and a `5-min` post-shift paced-breathing decompression before evening study.
- **Persona B — David (20, First-Year Computing Student & Part-Time Wheelchair Library Assistant):** `7+ hours/day` at screens, tight anterior chest/neck, limited student budget, campus recreation path nearby.
- Sample balanced blueprint: **three `25-min` brisk outdoor campus wheel/walk loops** (`RPE 13`) between lectures for daylight and focus (`S3.H1.L1`), **twice-weekly `25-min` seated band pull-aparts, rows, overhead/chest presses and wrist/chest static cool-downs** (emphasis on **pull-to-push** balance to counter desk posture), and a weekly intramural boccia or table-tennis social ladder.
- **Persona C — Keiko (21, Hospital Ward Assistant on Rotating Day/Evening Shifts):** irregular meal times, high emotional stress, noisy daytime apartment when sleeping after late shifts.
- Sample balanced blueprint: flexible **"anchor blocks"** (`20-min` bodyweight squat/push/row/bridge circuit + brisk `20-min` walk before shift rather than right before sleep), batch-prepped portable grain/legume/fruit snacks + water bottle so vending machines aren't the only option at `22:00`, dark eye-mask/quiet wind-down routine (connecting Grade 7 sleep hygiene), and opt-in `3-min` progressive muscle relaxation after stressful shifts.

✎ 3. Student-officiated inclusive lifetime-activity showcase (20 minutes)

Run a `20-minute` festival across 3–4 court/target zones (`3 × 6-min` mini-matches + `2 min` transitions) where every trio rotates through **Player**, **Inclusive Rules Official** and **Biomechanics Peer Coach (`S4.H3.L2`, `S4.H4.L2`)**:

- **Court 1 & 2 — Adapted Doubles Net/Wall (Pickleball / Paddle / Hand-Ball):** two-bounce rule automatically legal for wheelchair/seated players (or open two-bounce division for mixed pairs), wide and corner bonus zones from Lesson 1 active, self-officiated line calls with respectful immediate replay on ties.
- **Court 3 — Precision Target / Boccia Tactical Court:** standing, seated and ramp throwers compete on equal terms aiming at a movable jack ball; coaches give one specific kinematic cue per frame.
- **Station 4 (Side Check Station during rotations) — 60-Second Practical Check-In:** while trios rotate through Station 4, the teacher observes the practical components of the Unit Check (30-second manikin/foam-pad compression check + biomechanical target check) smoothly inside class time!

✓ 4. Five-part unit check (14 minutes)

Students complete the concise written/oral sheet (`14 minutes`; may be answered in writing, typed or orally with a scribe/partner check) alongside their Station 4 practical check:

1. **Part 1 — Biomechanics & Fitts's speed–accuracy trade-off (Practical + 2 sentences):**
2. Prompt: Demonstrate 4 controlled-speed placements to the wide court/target zone and 4 placements toward the narrow corner target. Then explain using **lever length** and **Fitts's law (D and W)** why players miss more often when swinging at maximum speed toward a narrow baseline corner from deep behind the court.
3. **Part 2 — Muscle contractions & agonist–antagonist balance:**
4. Prompt: A classmate's home routine consists of `100 push-ups and 100 sit-ups every day` and nothing else. (a) Identify the **concentric**, **eccentric** and **isometric** phases of a push-up with a 2-second bottom pause. (b) Explain what is missing from this routine in terms of **agonist/antagonist balance** and name two specific exercises to balance it.
5. **Part 3 — Heat, humidity and cold safety:**
6. Prompt: (a) Why does `31 °C` at `85%` humidity pose a much higher heat-illness risk than `31 °C` in dry air, and what sign distinguishes **heat stroke** (requiring an immediate emergency call and rapid cooling) from **heat exhaustion**? (b) At what core temperature does **hypothermia** begin, and why is **shivering stopping** in a cold, wet hiker an urgent danger sign rather than a sign they are warming up?
7. **Part 4 — Supplement claim audit & active fuel:**
8. Prompt: An influencer advertises " Nitro Shred X — Proprietary Blend: melts belly fat in 10 days and cures chronic fatigue!" Give **three scientific or regulatory reasons** this claim fails scrutiny (referencing DSHEA disease-claim rules, documented supplement adulteration risks, and spot-reduction physiology), and suggest an affordable real-food **before** and **after** snack + drink for Elena's 60-minute badminton session.
9. **Part 5 — Chain of Survival, CPR & AED readiness (Manikin/Foam-Pad Check + Short Answer):**
10. Prompt: Demonstrate **30 seconds of adult hands-only CPR** on the **manikin or foam pad** (`5–6 cm` depth, `100–120/min`, lower half of sternum, full recoil) and trainer-AED

safety callout ("Stand clear!"). In writing/orally: explain how your actions differ between (i) an unresponsive person breathing normally at 14 breaths/min and (ii) an unresponsive person making occasional agonal gasps every 20 seconds.

5. Cool-down and closing reflection (6 minutes)

- **4 min:** calm group walk/wheel, static upper- and lower-body cool-down stretches (`20–30 s`), and opt-in eyes-open paced breathing (`S3.H14.L2`).
- **2 min closing prompt:** each student circles **one lifetime activity** and **one local zero/low-cost venue** (`S3.H4.L1`—park court, walking/wheeling trail, community hall, home band corner) they can realistically use during exam weeks or after leaving school.

Worked answer guide for teachers

- **Part 1 (Biomechanics & Fitts's law):**
- Practical: student uses stable base/chair position, clean contact ahead of body, and appropriate pace to land consistent shots in the wide zone (`>= 3 of 4`) while adjusting grip/speed thoughtfully for the corner target.
- Explanation: under **Fitts's law (1954)**, task difficulty rises as target distance **D** increases and target width **W** decreases; swinging faster reduces sensory-correction time and increases spatial scatter. In addition, a long-handled racquet + extended arm acts as a velocity-magnifying lever ($v = \omega r$), so small angular errors at the wrist/shoulder produce larger directional misses over a long distance D.
- **Part 2 (Contractions & agonist–antagonist balance):**
- (a) Push-up phases: lowering chest toward the floor/wall under control = **eccentric** contraction (pectorals/anterior deltoids/triceps lengthen under tension); holding stationary for 2 seconds at the bottom = **isometric** contraction (tension with no change in muscle length); pressing back up to straight arms = **concentric** contraction (muscles shorten under tension).
- (b) Balance fix: `100 push-ups + 100 sit-ups` trains only anterior pushing and trunk flexion while neglecting posterior-chain antagonists (risking rounded-shoulder imbalance and overuse). Balance it by adding a **horizontal pull / row** (`rhomboids`, `middle trapezius`, `latissimus dorsi`, `biceps brachii`) and a **hip hinge / glute bridge** (`hamstrings`, `gluteus maximus`, `erector spinae`) plus rest/recovery days.
- **Part 3 (Heat, humidity & cold):**
- (a) Humidity & heat stroke: high ambient humidity slows **evaporation of sweat** from the skin, crippling the body's primary heat-loss mechanism. **Heat stroke** involves **central nervous system dysfunction** (confusion, slurred speech, staggering, seizure or unresponsiveness) alongside dangerously elevated core temperature—requiring an **immediate emergency call and rapid active cooling**—whereas **heat exhaustion** presents with heavy sweating, dizziness, nausea or cramps with intact mental status.
- (b) Hypothermia: begins below **`35.0 °C (95.0 °F)`** core temperature. **Shivering stopping** alongside worsening confusion indicates progression from **mild** to **moderate hypothermia** (exhaustion/failure of thermoregulatory shivering), requiring immediate shelter, gentle handling, dry insulation and urgent medical care.
- **Part 4 (Supplement audit & active fuel):**
- Three critique points: (1) Under US federal rules (DSHEA 1994), dietary supplements are **legally barred from claiming to cure, treat or prevent disease** ("cures chronic fatigue" is an illegal disease claim) and do not undergo pre-market clinical efficacy approval like prescription drugs; (2) **"Proprietary blends"** hide ingredient doses, and 2007–2016 surveillance identified **776 adulterated supplements** (heavily concentrated in weight-loss

and muscle-building products) containing unlisted pharmaceuticals or anabolic steroids; (3) **"Spot-reducing belly fat"** is physiologically impossible because working muscles draw on systemic energy stores rather than local fat deposits.

- Elena's 60-min badminton fuel: **Before:** easily digested carb + light protein + water (e.g., banana + oat bar or toast + water `1–2 h` prior); **During: plain water** (no commercial sports drink needed for `< 60 min` temperate play); **After:** water + balanced carb-and-protein meal/snack (e.g., rice-and-bean bowl, tofu/chicken wrap, or yoghurt with fruit and oats).
- **Part 5 (Chain of Survival, CPR & AED — manikin/foam pad only):**
- Practical (on manikin/foam pad ONLY): checks scene safety, calls for emergency services + AED, places heel of hand on **lower half of sternum**, pushes **`5–6 cm (2.0–2.4 in)` deep** at **`100–120/min`** with straight arms and **full chest recoil**, and calls **"Stand clear!"** visually checking nobody touches the manikin during trainer-AED analysis and shock before resuming compressions immediately.
- Written/oral distinction: (i) **Unresponsive + breathing normally (`14/min`): do NOT perform CPR**; place on side in the **recovery position** to keep the airway/pharynx clear, call help, and monitor breathing continuously. (ii) **Unresponsive + occasional agonal gasps:** agonal gasps are abnormal brainstem reflexes, **not** normal breathing—treat immediately as **cardiac arrest** (call emergency services on speakerphone, start hands-only CPR, attach AED immediately).

Proposed K–12 Computing & Systems Progression (Draft Framework)

Status: Proposed framework (unreviewed AI draft; CC0 1.0)
Author: Gemini 4 Argon
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> **Important distinction:** This document maps a proposed K–12 sequence for Computing and Systems Engineering across four grade bands. Listing a topic below does **not** mean lessons for that topic are written. Only units explicitly marked `written` in the main Status table have full lesson plans, worked examples, and assessments.

Core Pedagogical Principles

1. **Physical & Unplugged Before Screen-Based:** Students first enact algorithms, binary states, logic switches, and packet routing using index cards, flashlights, and grid paper before translating those mental models into code.
2. **No Unstated Mathematical Prerequisites:** Computing units introduce any required mathematical machinery inside the lesson itself (for example, Grade 6 Binary introduces repeated doubling `1, 2, 4, 8, 16...` directly from place-value cards without assuming prior exponent notation, while reinforcing Grade 6 ratios and unit rates such as bits per pixel and packets per second).
3. **Inspectable Systems Over Black Boxes:** At every band, students inspect how data is represented, how state changes step by step, how errors happen, and where human design choices shape software behavior.

Band-by-Band Sequence

Band 1: Grades K–2 (Ages 5–8) — Sequences, Symbols, and Everyday Machines

- **Kindergarten (Everyday Instructions, Robot Paths, and Pattern Debugging):**
- **Term 1 — Clear Instructions for Everyday Tasks: [Unit Written: `units/computing/K-clear-instructions/`]** Following and giving short instructions in order; putting three picture steps in sequence (first, next, last); spotting and fixing an out-of-order step.
- **Term 2 — Step-by-Step Robot Recipes and Floor-Grid Paths: [Unit Written: `units/computing/K-step-by-step-robot-recipes/`]** Ordering 4-step daily routines; acting out "robot partner" movement instructions (`Forward`, `Turn Left`, `Turn Right`, `Pick Up`) on a 3×3 floor grid; finding and fixing a single bug; clapping and moving in repeating AB/AAB loops.
- **Term 3 — Patterns and Fixing a Wrong Step: [Unit Written: `units/computing/K-patterns-and-fixing-a-wrong-step/`]** Copying, continuing, and making AB, ABB, and AAB sound, movement, and picture-card patterns; finding and swapping the single card that breaks a pattern; taking turns as programmer, bot, and tester (after CS Unplugged's Kidbots) to test a block line against a goal strip and fix a bug.
- **Grade 1 (Symbols, Signals, Sorting, Floor-Robot Programming, and Picture Charts):**

- **Term 1 — Symbols, Signals, and Sorting: [Unit Written: units/computing/1-symbols-signals-and-sorting/]** Representing yes/no choices with two-color tokens; sorting objects by a single rule (attribute); recognizing which everyday tools store or send information.
- **Term 2 — Programming a Floor Robot: [Unit Written: units/computing/1-programming-a-floor-robot/]** (by Claude Opus 5.5) Planning, acting out, and debugging short `FORWARD`, `TURN LEFT`, `TURN RIGHT`, and `PAUSE` programs on a floor grid; protecting passwords and personal information.
- **Term 3 — Picture Charts and Private Information: [Unit Written: units/computing/1-picture-charts-and-private-information/]** (by Claude Opus 5.5) Collecting class tally data and drawing a picture chart; comparing how computing tools changed everyday tasks; keeping private information safe.
- **Grade 2 (Loops, Codes & Plans, and Data Pictures):**
- **Term 1 — Repeating Patterns, Maps, and Privacy: [Unit Written: units/computing/2-repeating-patterns-maps-and-privacy/]** Repeating patterns (`repeat 4 times`); debugging a treasure-map path; distinguishing private personal information from public classroom work.
- **Term 2 — Codes and Plans: [Unit Written: units/computing/2-codes-and-plans/]** (by Claude Opus 5.5) Using numbers or symbols to stand for information (a picture made of numbered squares); planning a program's goal and expected outcome before running it; breaking a task into precise steps and crediting reused ideas.
- **Term 3 — Same Data, Different Pictures: [Unit Written: units/computing/2-same-data-different-pictures/]** (by Claude Opus 5.5) Collecting tally data, building a picture chart and a bar chart from the same numbers, spotting patterns and making a prediction, and working kindly online while keeping passwords private.

Band 2: Grades 3–5 (Ages 8–11) — Events, Variables, and Network Paths

- **Grade 3 (Inputs, Outputs, Loops, Conditionals, Events, and Variables):**
- **Term 1 — Inputs, Outputs, Loops, and Debugging: [Unit Written: units/computing/3-inputs-outputs-and-algorithms/]** Input–process–output machines; step-by-step grid algorithms; `REPEAT` loops; `IF / THEN / ELSE` decision branches; finding and fixing bugs.
- **Term 2 — Events and Variables: [Unit Written: units/computing/3-events-and-variables/]** (by Claude Opus 5.5) Event scripts (`WHEN ...:`) that wait until something happens; named variables (`SET`, `CHANGE ... BY`, `SAY`) that hold one value at a time; tracing and fixing a missing score reset; decomposing a two-variable quiz buzzer program into four parts; remixing a program with `NOTE:` credit comments.
- **Term 3 — Data and Networks: [Unit Written: units/computing/3-data-and-networks/]** (by Claude Opus 5.5) Sending a message as numbered packets through "router" children, reassembling out-of-order packets, requesting lost packets via a copy set, and discarding duplicates (`1B-NI-04`); sorting, tallying, and charting made-up Little Hill library loans and weather/visitor data to back up a claim, predict outcomes, and distinguish pattern from cause (`1B-DA-06`, `1B-DA-07`); and sorting made-up information into private vs. shareable, spotting trick messages, and building pretend four-word passphrases (`1B-NI-05`).
- **Grade 4 (Countdown Timers, Multi-Variable State, and Structured Data Tables):** Building on Grade 3's events, variables, and decomposition to track multiple changing variables (including countdown timers and subtracting values), nested loops and conditionals, and organizing multi-column sensor or survey records into structured rows and columns.
- **Grade 5 (How Messages Travel & Digital Citizenship):** Physical string-and-card model of routers and switches; why breaking a long message into numbered postcards works better than sending one giant scroll; evaluating source credibility online.

Band 3: Grades 6–8 (Ages 11–14) — Data Representation, Text Programming, and Algorithms

- **Grade 6 (Binary Representation, Pixels, Logic Gates, and Packet Switching): [Unit Written: `units/computing/6-binary-and-networks/`]**
- Repeated doubling (`1, 2, 4, 8, 16, 32, 64, 128`) and 8-bit binary numbers without requiring exponent notation.
- Text encoding (ASCII character tables) and 1-bit / 2-bit bitmap pixel grids (connecting to Grade 6 ratios and unit rates: bits per pixel, aspect ratio).
- Boolean logic switches (`AND`, `OR`, `NOT`) wired in series and parallel.
- Packet switching, out-of-order reassembly, transmission unit rates (kilobits per second), and single-bit even-parity error detection.
- **Grade 7 (Text Programming Fundamentals & Stateful Simulation):** Functions, parameters, `for`/`while` loops, lists/arrays, and debugging with print traces and assertions in Python or JavaScript.
- **Grade 8 (Search, Sorting, Databases, and Recommendation Systems):** Linear vs. binary search comparisons; selection vs. merge sort with card decks; querying structured tables; how ranking formulas weight user signals.

Band 4: Grades 9–12 (Ages 14–18) — Systems Architecture, Algorithms, Data Science, and AI Literacy

- **Grade 9 (Computer Architecture & Operating Systems Basics):** From logic gates to a 4-bit adder and register file; fetch–decode–execute instruction cycle; memory hierarchy and file systems.
- **Grade 10 (Data Structures, Graph Algorithms, and Shortest Paths): [Unit Written: `units/computing/10-data-structures-and-graphs/`]** Stacks (LIFO) and queues (FIFO), hash tables with modulo indexing and separate chaining, graph representations (adjacency matrix vs. adjacency list), Breadth-First Search (BFS), and Dijkstra's shortest-path algorithm.
- **Grade 11 (Data Science, Cryptography, and Network Security):** Exploratory data analysis, sampling bias, symmetric vs. public-key encryption intuition, hashing, and threat modeling.
- **Grade 12 (Capstone Software Engineering & Mechanics of Machine Learning):** Version control, automated testing, accessibility audits, linear models and gradient descent intuition, dataset provenance, and societal impacts of automated decision systems.

Cross-Subject Connections with Science and Mathematics

Grade	Computing Topic	Mathematics Connection (`units/mathematics/`)	Science Connection (`units/science/`)
6	Binary, Pixels, Logic Gates, and Packet Switching	**Ratios & Unit Rates (`6-ratios`):** Aspect ratios (`width : height`), color depth (`bits per pixel`), and network throughput (`packets per second`, `errors per 100 packets`). No exponent notation assumed.	**Fungi & Decomposition (`6-fungi`):** Encoding field-observation sensor logs (temperature, moisture, mass loss) as compact binary records and two-variable classification rules (`IF moist AND warm`).

Kindergarten Computing: Clear Instructions for Everyday Tasks (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 on 6 November 2026. No human teacher has reviewed this unit. CC0 1.0 (public domain). Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Part of the kindergarten year plan (computing, term 1). It comes before Gemini 4 Argon's term-2 unit, Step-by-step robot recipes and floor-grid paths, which turns these spoken instructions into arrow cards and grid paths.

Big idea

Computers only do exactly what they are told, so the people who write instructions for them have to be clear. Kindergarten children can start long before they touch a computer: by following and giving instructions in everyday tasks, and noticing that **which one**, **where** and **in what order** all matter.

This unit is "unplugged": no screens or devices are needed.

Outcomes

By the end of the unit, most children can:

1. Follow a spoken two-step instruction in the order given (for example "Clap twice, then touch your knees").
2. Use at least four position words to place or find an object: **on**, **under**, **next to**, **in front of**, **behind** (above and below as a bonus).
3. Say which word was missing when an instruction was not clear enough (which one, where, or how many).
4. Give a partner instructions to copy a three-block tower, and ask a question when an instruction is not clear ("Which colour?").
5. Give a classmate two clear steps for an everyday task, such as tidying a toy away.

Prior knowledge

- None needed beyond everyday classroom talk. Children do not need to read, write or count past 3.
- Helpful: the stop-and-go games from Health and PE term 1, and the handwashing steps, which lesson 5 reuses as an example of steps in order.

Lessons

Lesson	Title	Time	Core idea
1	Listen and do	20 min	Follow one- and two-step instructions; order matters
2	Where is Teddy?	25 min	Position words: on, under, next to, in front of, behind
3	The very exact puppet	25 min	A helper that does exactly what you say; fixing unclear words

Lesson	Title	Time	Core idea
4	Build my tower	25 min	Giving and asking about instructions in pairs
5	Instruction helpers	25 min	Two clear steps for an everyday task; showing what we know

Materials

- A soft toy ("Teddy", or any toy the class likes) and a box big enough to put it in.
- A hand puppet or a second soft toy for lesson 3 (a sock puppet is fine).
- Large building blocks in three colours (red, blue, yellow), two sets of three per pair for lesson 4 (one set each for the giver and the builder), plus a teacher set and spares. Use blocks too big to swallow.
- A low barrier for each pair in lesson 4: a big book stood on its end, a folder or a cardboard screen.
- Picture cards for position words (optional) and a few everyday objects (cup, crayon, book, hat).

Access and inclusion

- Instructions can be spoken, signed or shown with picture cards; accept answers by pointing, signing, a communication device or moving the object.
- Movement in lesson 1 is opt-in in form: a child can nod, tap the table or point instead of standing or clapping.
- Some children find barrier games stressful. Let a pair sit side by side and just cover the builder's eyes with their hands, or let the teacher be the partner.
- **Colour vision:** some children cannot tell some colours apart (most often red from green). Red, blue and yellow blocks are usually easier, but you can also mark each colour with a shape or dot pattern, and in lessons 3 and 5 choose toys that also differ in size. If a child mixes up only colours, note it privately for the class teacher; it is not an instruction gap.
- Ear defenders and a quiet spot should be available; the puppet's silliness gets loud.
- Position words differ between languages, and some children will know them first in their home language. Welcome those words; then add the English word alongside.
- Lesson 5's check is done in small groups; plan a separate one-to-one slot (about 5 minutes per child, at another time if needed) for children who are quiet in groups.

Assessment

Lesson 5 has a short five-part check, done by watching and listening, not on paper:

1. Follows a two-step instruction in order.
2. Places Teddy correctly for three position words.
3. Spots the missing word in an unclear instruction (which one / where).
4. Gives at least one clear tower instruction with a colour and a position.
5. Gives a classmate two clear steps for a tidy-up task.

Short daily closing checks are in each lesson.

Sources

- Wikipedia, Algorithm (read 6 November 2026): an algorithm is "a finite sequence of mathematically rigorous instructions". This unit uses only the everyday idea behind that:

clear instructions in a set order. The word "algorithm" is not taught here; Argon's term-2 unit introduces it.
- Wikipedia, Computational thinking (read 6 November 2026): expressing problems and solutions "in ways a computer could also execute".
- Common Core State Standards, Kindergarten Geometry, K.G.A.1: "describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to". Lesson 2 uses these words.
- Common Core State Standards, Kindergarten Speaking and Listening, SL.K.3 ("Ask and answer questions in order to seek help, get information, or clarify something that is not understood") and SL.K.6 ("Speak audibly and express thoughts, feelings, and ideas clearly"). Lessons 3 and 4 build on these.
- No computing standard was read for this unit. The barrier game and the "very exact helper" are common classroom activities; the versions here are written for this unit.

Known gaps

- No computing standard was checked, so the choice of skills is mine; it links to Argon's term-2 unit and the year plan, not to a published sequence.
- The "very exact puppet" can make children think computers are being silly on purpose. Lesson 3 says plainly that computers are not joking; they just cannot guess.
- Position words are English; left and right are left out on purpose, because many 5-year-olds are still learning them (an assumption, not a sourced claim).
- Five short lessons will not make every child fluent at giving instructions; Argon's term-2 unit and the term-3 "fixing a wrong step" work keep practising.
- Peer check: Gemini 4 Argon did a bounded text check on 6 November 2026 at 4bb5a9a (recorded in PEERCHECKS.md); fixes are in 29234ff, which Argon also diff-checked the same day.

Lesson 1: Listen and do (20 min)

Back to the unit

Goal

Children follow one-step and then two-step spoken instructions, and notice that doing the same two steps in a different order can look different.

Materials

- Open space or children standing by their chairs.
- Optional picture cards for actions (clap, touch knees, sit down, stand up, wave, touch nose).

Steps

✎ Opening (3 min)

Say: "Today we are going to be very good listeners. I will say what to do, and you do exactly that, no more and no less."

Give three one-step instructions slowly: "Touch your nose." "Wave one hand." "Sit down." Praise children who waited until you finished speaking.

✎ Main activity: one step, then two steps (10 min)

1. **One step (3 min).** Mix fast and slow: "Clap once." "Stand up." "Touch your knees." Show the picture card at the same time for children who need it.
2. **Two steps (4 min).** Use the word **then**: "Clap twice, then touch your knees." "Stand up, then turn around." "Touch your nose, then sit down." Wait until you have said both steps before anyone moves; a quiet "ready... go" helps.
3. **Swap the order (3 min).** Say "Stand up, then sit down." Then say "Sit down, then stand up." Ask: "Did we do the same thing?" Children who are sitting at the end versus standing at the end can see the difference.

Nobody is "out". If a child does the steps in the wrong order, say what they did ("You touched your knees first") and try again together.

Talk about it (5 min)

- "Why did we wait until I finished speaking?" (So we heard both steps.)
- "Stand up, then sit down" and "sit down, then stand up": what was different? (Where we ended up; standing or sitting.)
- "If I just said 'Clap', how many times would you clap?" (We do not know; the instruction did not say. Accept any answer; the point is that it was not clear.)

✓ Closing check (2 min)

Give each table one two-step instruction, for example "Put your hands on your head, then on your shoulders." Watch who does both steps in order.

Answer: hands on head first, then shoulders.

Vocabulary

instruction, first, then, listen

Differentiation

- Support: one step at a time with a picture card; let a child copy a buddy.
- Stretch: three steps ("Clap, then stamp, then sit down"), or let a child give a two-step instruction to the class.

⚠ Safety

Check the space is clear before "turn around". Movement is opt-in in form: nodding, tapping or pointing counts.

Teacher notes

This is the everyday version of what a computer does: follow steps, in order, exactly. Do not use the word "algorithm" yet; Argon's term-2 unit introduces it.

Lesson 2: Where is Teddy? (25 min)

Back to the unit

Goal

Children use position words to place and find an object: **on**, **under**, **next to**, **in front of**, **behind** (with **above** and **below** as a bonus).

Materials

- Teddy (or any soft toy) and a box.
- A chair, a cup, a book.
- For the pair practice: one hiding object per pair (a soft toy, a crayon or a block, too big to swallow); the pair hides it near classroom furniture they can already see.
- Optional picture cards showing Teddy on, under, next to, in front of and behind the box.

Steps

✎ Opening (3 min)

Put Teddy on the box. Ask: "Where is Teddy?" Accept any answer, then say "Teddy is **on** the box." Move Teddy under a chair: "Now Teddy is **under** the chair."

✎ Main activity: Teddy moves (12 min)

1. **Show and say (4 min).** Put Teddy on, under, next to, in front of and behind the box, saying each word as you do it. The class says the word back each time.
2. **Children move Teddy (5 min).** One child at a time: "Put Teddy **behind** the box." The class checks with a thumbs up or a "try again". Give each word to at least two children.
3. **Where does "in front of" point? (3 min).** Stand Teddy in front of the box facing the class. Then walk to the other side of the room and ask: "Is Teddy still in front of the box?" Children may disagree, and that is fine: "in front of" can depend on where you stand, or on which way Teddy or the box faces. In this lesson and the closing check in lesson 5, any placement that fits one clear way of looking (from where the child stands, or from the way the object faces) counts as correct. Say: "That is why clear instructions sometimes need more words."

Practice: hide and find in pairs (8 min)

In pairs, one child hides a small toy or crayon in the classroom space near them (on, under, next to, in front of or behind something) and tells their partner where it is using one position word, for example "It is under the book." The partner finds it. Then swap.

Walk around and listen for position words. If a child says "over there", ask: "Can you use one of our Teddy words?"

✓ Closing check (2 min)

Ask three children, one at a time:

- "Put Teddy **on** the chair."
- "Put Teddy **under** the chair."
- "Put Teddy **next to** the cup."

Answer: Teddy on the seat of the chair; Teddy under the chair; Teddy beside the cup, touching or close.

Vocabulary

on, under, next to, in front of, behind; above, below (bonus)

Differentiation

- Support: start with only on, under and next to; use the picture cards.
- Stretch: two words together ("Put Teddy under the chair, next to the cup"), or above and below with a shelf.

⚠ Safety

Hide objects only in reachable places, not high up and not inside bags or cupboards.

Teacher notes

These are the position words named in Common Core K.G.A.1. Left and right are left out on purpose; many 5-year-olds are still learning them. Children who know the words first in another language should be welcomed to say both.

Lesson 3: The very exact puppet (25 min)

Back to the unit

Goal

Children see a helper that does exactly what it is told, notice when an instruction was not clear enough, and add the missing word: **which one**, **where** or **how many**.

Materials

- A hand puppet or soft toy (call it "Exact"; any name works).
- Two toys that are different colours or sizes (for example a big red car and a small blue car), a box, three crayons.

Steps

✎ Opening (3 min)

Introduce the puppet: "This is Exact. Exact is very helpful, but Exact cannot guess. Exact only does exactly what you say."

✎ Explain and model (5 min)

Put the two cars on the table. Say to the puppet: "Exact, put the car away."

Make the puppet stop, look at both cars, and say: "Which car? I can't guess!"

Ask the class: "What should we say?" Help them to "Put the **red** car away" or "the **big** car".

Now say: "Exact, put the red car." Make the puppet hold the red car up and freeze. "Put it where? I can't guess!" The class adds: "**in** the box".

✎ Main activity: fix it for Exact (12 min)

Give the puppet these unclear instructions one at a time. After each, the puppet shows what it would do (or says "I can't guess!"). The class fixes the words.

Unclear instruction	What Exact does	A clear version
"Give me a crayon."	Holds all three, can't choose	"Give me the **green** crayon."
"Put the book down."	Holds it over the floor, freezes	"Put the book **on the table**."
"Clap."	Claps and claps and does not stop	"Clap **two times**."
"Put Teddy next to it."	Looks around: next to what?	

Unclear instruction	What Exact does	A clear version
		"Put Teddy **next to the box**."
"Stand up, sit down." (said fast and unclear)	Stands and sits over and over	"Stand up, **then** sit down."

Each time ask: "What word did Exact need? Which one, where, or how many?" Accept any clear fix; there is more than one right answer.

Talk about it (3 min)

- "Was Exact being silly?" Say plainly: "No. Exact was not joking. Exact just couldn't guess what we meant."
- "Computers are a bit like Exact. They do what they are told and they can't guess. People who make computers do things have to be very clear."

✓ Closing check (2 min)

Puppet: "Exact, put the car in the box." (Both cars are still on the table.)

Ask: "What does Exact need to know?"

Answer: which car (for example "the blue car" or "the small car").

Vocabulary

clear, exact, which one, where, how many

Differentiation

- Support: show the choices with gestures or pictures; let the child point to the thing Exact needs.
- Stretch: children make up an unclear instruction and the class fixes it.

⚠ Safety

Keep the puppet's actions gentle; no throwing. Some children find a puppet that "won't listen" frustrating; keep it light and switch to a fix quickly.

Teacher notes

The puppet's job is to show that unclear words lead to guessing or getting stuck, not to make the children feel they got it wrong. Praise every clear fix. Asking "which one?" is a good question for children to ask too (Common Core SL.K.3: ask questions to clarify something not understood); lesson 4 practises that.

Lesson 4: Build my tower (25 min)

Back to the unit

Goal

Children give a partner clear instructions to copy a three-block tower, and the builder asks a question when an instruction is not clear.

Materials

- For each pair: two sets of three large blocks (one red, one blue, one yellow), and a low barrier (a big book stood on end, a folder or a cardboard screen).
- One set for the teacher's demonstration.

Steps

✎ Opening (3 min)

Remind the class of Exact: "Exact couldn't guess. Today **you** are going to be the builder who can't see, and your partner has to be clear."

✎ Explain and model (5 min)

Build a tower behind the barrier where only the class can see it: red at the bottom, blue in the middle, yellow on top. Ask a volunteer to be the builder on the other side.

Model good instructions, one block at a time:

1. "Put the **red** block on the table."
2. "Put the **blue** block **on** the red block."
3. "Put the **yellow** block **on** the blue block."

Then lift the barrier. Same tower? Celebrate.

Model a question too: say "Put the next block on top," and have the builder ask "**Which colour?**" Praise the question: "Good builders ask when they are not sure."

✎ Main activity: pairs build (12 min)

1. Pairs sit with the barrier between them. The giver builds a tower of three blocks on their side, in any order they like.
2. The giver tells the builder how to make the same tower, one block at a time. The builder may ask questions: "Which colour?" "On top or next to?"
3. Lift the barrier and compare. If the towers are different, find the step where they went different, and fix it together.
4. Swap roles and build again. Most pairs can do two to four rounds.

Walk around. Listen for colour words and position words. If a giver says "put that one there", ask the builder: "Do you know which one and where?"

Talk about it (3 min)

- "Which words helped the most?" (Colour words; on, next to.)
- "When did a question help?" (When the builder didn't know which block or where.)
- "If the towers were different, was anyone bad at building?" (No. Usually a word was missing or heard wrong, and we fixed it.)

✓ Closing check (2 min)

Show a tower: red at the bottom, blue in the middle, yellow on top. Ask a child to say the first instruction, then a second child the next one, then a third.

Answer: "Put the red block on the table." "Put the blue block on the red block." "Put the yellow block on the blue block." (Any version that names the colour and says "on" is right.)

Vocabulary

builder, giver, on, on top, next to, question

Differentiation

- Support: two blocks only; or the teacher is the partner; or the pair sits side by side with the builder covering their eyes.
- Stretch: four blocks, or a block **next to** another as well as on top, or let the builder use only questions ("Is the bottom one red?").

⚠ Safety

Use large blocks only (nothing small enough to swallow). Barriers should be light and stable.

Teacher notes

This is a version of a common "barrier game" used for speaking and listening. Here it practises the computing idea that instructions must be complete and in order, and Common Core SL.K.3 (asking to clarify) and SL.K.6 (speaking clearly).

Lesson 5: Instruction helpers (25 min)

Back to the unit

Goal

Children give a classmate two clear steps for an everyday task, spot a missing step, and show what they have learned in a short check.

Materials

- A few everyday objects for tidy-up tasks (book, crayon pot, hat, cup).
- A chair, a cup, two different toy cars, and two large blocks (one red, one blue) for the closing check.
- Teddy and a box; the handwashing step cards from Health and PE term 1 if you have them.

Steps

✎ Opening (3 min)

Say: "We have been very clear instruction-givers. Today we are instruction helpers for everyday jobs."

Remind children of the handwashing steps: wet, soap, rub, rinse, dry. Ask: "What would happen if we dried our hands before we washed them?" (They'd be wet again; the order matters.)

✎ Main activity: two clear steps (10 min)

1. **Model (3 min).** "Mia, pick up the **book**, then put it **on the shelf**." Point out the two steps, the **then**, the **which one** and the **where**.
2. **Pairs (7 min).** In pairs, one child gives two clear steps for a tidy-up job using the objects ("Pick up the hat, then put it in the box"). The partner does it. Then swap. Listen for which-one and where words.

Spot the missing step (5 min)

Say each set of steps and ask: "What's missing?"

- "Get a cup. Drink the water." **Answer:** fill the cup with water (between getting the cup and drinking).
- "Put on your coat. Go outside. Open the door." **Answer:** the steps are in the wrong order; open the door before going outside. (Accept "out of order" as the answer; finding and fixing a wrong step is practised again in term 3.)

✓ Closing check: five parts (7 min)

Do this with small groups while others draw "me giving clear instructions"; use a one-to-one slot for quieter children.

1. Say: "Touch your head, then clap once." **Watch for:** head first, then one clap.
2. Say: "Put Teddy **under** the chair." Then "**behind** the box." Then "**next to** the cup." **Watch for:** all three placed correctly. For "behind", accept a placement that fits where the child stands or the way the box faces.
3. With two cars on the table, say: "Put the car in the box." Ask: "What's missing?" **Answer:** which car.
4. Show a two-block tower (blue on red). Ask: "Tell me how to build this." **Watch for:** a colour word and a position word ("Put the blue block on the red block").
5. Ask the child to tell a classmate two steps for tidying a book away. **Watch for:** two steps, with which one and where.

Record each part as "yes", "with help" or "not yet". A "not yet" is fine at this stage; Argon's term-2 unit keeps practising.

Vocabulary

steps, order, then, missing, clear

Differentiation

- Support: accept pointing, signing or picture cards in every part. In part 1, keep both steps in one instruction (spoken, signed, or two picture cards shown together) so the check still tests order; a seated or pointing action is fine. In the other parts, one step at a time is fine.
- Stretch: three steps for a job; or ask the child to say why a step order matters.

⚠ Safety

Keep tidy-up tasks to safe, light objects within reach. No climbing to shelves.

Teacher notes

Next term, Argon's robot recipes unit turns these spoken steps into arrow cards and picture cards in First, Next, Last order, and introduces the word "algorithm".

Kindergarten Computing: Patterns and Fixing a Wrong Step (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 on 6 November 2026. No human teacher has reviewed this unit. CC0 1.0 (public domain). Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Part of the kindergarten year plan (computing, term 3). It comes after Clear instructions for everyday tasks (term 1) and Gemini 4 Argon's Step-by-step robot recipes and floor-grid paths (term 2). Argon's unit already fixes a wrong step on a floor grid and repeats action patterns; this unit uses **picture-card patterns** instead, and adds the job of a **tester** who checks the work against a goal.

Big idea

A pattern is something that repeats in a way you can predict, so you can say what comes next. When a pattern or a list of steps goes wrong, you can look for the one part that does not fit and fix just that part. People who write programs do the same: they check the result, find the wrong step (a **bug**) and change it.

This unit is "unplugged": no screens or devices are needed.

Outcomes

By the end of the unit, most children can:

1. Copy and continue a simple sound or movement pattern (for example clap, stamp, clap, stamp).
2. Say or show what comes next in a picture pattern of the kinds AB, ABB and AAB.
3. Make their own repeating pattern that repeats at least twice.
4. Find the one card that does not fit in a broken pattern and fix it.
5. Take a turn as programmer, bot or tester, and as tester find and swap one wrong instruction card.

Prior knowledge

- Following and giving instructions in order (term 1) and using arrow or step cards (Argon's term-2 unit).
- Telling red from blue, and circles from squares (the cards use both, so either is enough).
- Children do not need to read or write. Counting to 6 helps in lesson 4 but is not required.

Lessons

Lesson	Title	Time	Core idea
1	Pattern detectives	20 min	Sound, movement and picture patterns; the part that repeats
2	What comes next?	25 min	Continuing AB, ABB and AAB patterns; making our own
3	The broken pattern	25 min	Finding the one card that does not fit and fixing it

Lesson	Title	Time	Core idea
4	The tester's job	25 min	Programmer, bot and tester; finding and swapping a wrong card
5	Pattern show	25 min	Showing our patterns; a short one-to-one check

Materials

- **Pattern cards** (about 8 cm across, card or laminated paper): every card shows a shape filled with one colour, so shape and colour both tell the cards apart.
  - Red circle cards and blue square cards: 6 of each per pair (lessons 2, 3 and 5).
  - A large teacher set: 10 red circles, 10 blue squares and 4 yellow triangles (lessons 1–5), plus a strip of card or a line of floor tape to lay them along.
  - Raised versions for children who need them: a felt or foam circle and square glued on (lessons 1–5).
- **Building pieces** for lesson 4, per group of three: 4 red round blocks (short cylinders, stood on end) and 4 blue square blocks (cubes). Use pieces too big to swallow; no beads.
- **Lesson 4 card sets**, per group of three: one goal strip (a picture of the finished line), six instruction cards with one deliberately wrong card (sets A, B and C in lesson 4), and three spare cards of each kind.
- **Teacher strips** for lesson 4: a demonstration set (goal red, blue, red, blue, red, blue; instruction cards red, blue, red, red, red, blue) and a closing-check set (goal red, blue, blue, red, blue, blue; instruction cards red, blue, red, red, blue, blue).
- **Check strip** for lesson 5, part 5: a goal strip showing red, blue, red, blue, four instruction cards (one red circle, three blue squares) and a spare red circle card.
- **Role badges** for lesson 4, one set per group: programmer (a picture of a hand laying a card), bot (a robot face), tester (a magnifying glass).
- A small drum or a table to tap for sound patterns (optional; claps and stamps are enough).
- A class list for the lesson 5 check.

Access and inclusion

- Every card uses shape **and** colour, so a child who cannot tell red from blue can use the shapes, and a child who is still learning shape names can use colours. Accept "circle", "red", "round" or pointing.
- Answers can be spoken, signed, pointed to, given with a communication device or shown by moving a card.
- Children with limited hand movement can direct an adult or partner ("that one, there") instead of placing cards themselves; directing counts fully.
- Low vision: use the raised cards and hold them close; read the pattern aloud while the child touches each card in order.
- Deaf or hard-of-hearing children: every sound pattern is also a movement pattern they can see (clap, stamp), and a child can rest a hand on the drum or table to feel taps.
- Movement is opt-in in form: tapping knees, nodding or pointing counts as a clap or stamp.
- Some children find being "wrong" upsetting. The broken patterns are made by the teacher or a partner on purpose, and finding a mistake is the goal, not a failure.
- The lesson 5 check is one-to-one, about 3 minutes per child, at a separate time if needed.

Assessment

Lesson 5 has a six-part one-to-one check (about 3 minutes per child), done by watching and listening, not on paper:

1. Copies clap, stamp, clap, stamp and continues it with one more clap, stamp.
2. Says what comes next: circle, square, circle, square, circle, ? (**square**).
3. Says what comes next: circle, square, square, circle, square, square, circle, ? (**square**).
4. Finds the wrong card in circle, square, circle, square, circle, circle, circle, square (**the 6th card**, a circle, should be a square).
5. As tester, compares a goal of red, blue, red, blue with instruction cards red, blue, blue, blue, and swaps **card 3** for a red card.
6. Makes their own pattern of at least six cards that repeats at least twice.

Short daily closing checks are in each lesson.

Sources

- Wikipedia, Pattern (read 6 November 2026): a pattern is a regularity whose elements repeat in a predictable manner, and patterns can be observed with any of the senses. Lessons 1 and 2 use sound and movement patterns as well as picture patterns for this reason.
- Wikipedia, Debugging (read 6 November 2026): debugging is finding the root cause of bugs and possible fixes. Lessons 3 and 4 use only the everyday idea: find the one part that is wrong and fix it.
- CS Unplugged, Kidbots (read 6 November 2026): uses the roles of programmer, bot and tester, and describes programming as planning, coding, testing, tracking down bugs and changing the program so it works; real programs are often written by teams with separate roles. Lesson 4 borrows these three roles; its card-pattern activity is written for this unit, not copied from CS Unplugged.
- No computing standard was read for this unit.

Known gaps

- No computing standard was checked, so the choice of skills is mine; it links to the term-1 and term-2 units and the year plan, not to a published sequence.
- The pattern types (AB, ABB, AAB) and the order they appear in are my choice, not taken from a source.
- One wrong card per broken pattern keeps the idea simple; real bugs can be several, or hard to find, and that is left for later grades (for example Argon's grade 2 unit).
- Some 5-year-olds will find ABB and AAB hard. Lesson 2 keeps AB as the core and treats the others as next steps; lesson 5 notes which kinds each child could do.
- Peer check: Gemini 4 Argon did a bounded text, timing and answer-key check at 338d05b (not an educator, safety or accessibility review) and found no timing or answer-key errors. Its two optional notes (list the lesson 4 and 5 teacher strips in Materials; say how a child with low vision can be the tester) were added in a47787e, which Argon also diff-checked the same day (see PEERCHECKS.md). Not reviewed by a teacher.

Lesson 1: Pattern detectives (20 min)

Back to the unit

Goal

Children copy and continue sound and movement patterns, see the same kind of pattern in picture cards, and find the part that repeats.

Materials

- The large teacher set of pattern cards (red circles, blue squares) and a strip or line of floor tape to lay them along.
- Raised cards for children who need them.
- Optional: a small drum or a table to tap.

Steps

✎ Opening (3 min)

Without speaking, clap, stamp, clap, stamp, clap, stamp. Then stop and wait. Most children will want to fill the gap. Ask: "What do you think comes next?" (A clap.)

Say: "That was a **pattern**. A pattern repeats, so we can guess what comes next. Today we are pattern detectives."

✎ Main activity: hear it, move it, see it (10 min)

1. **Copy me (3 min).** Do each pattern twice, then the class joins in: clap, stamp (AB); clap, clap, stamp (AAB); pat knees, clap, clap (ABB). Say the words as you go ("clap, stamp, clap, stamp") so children can hear as well as see the pattern.
2. **The part that repeats (3 min).** Do clap, stamp, clap, stamp again and ask: "What part keeps coming back?" (Clap, stamp.) Show it with two fingers: "This little bit, again and again."
3. **See it (4 min).** Lay red circle, blue square, red circle, blue square, red circle, blue square along the strip. Read it together: "circle, square, circle, square..." or "red, blue, red, blue...". Ask a child to point to the part that repeats (one circle and one square). Then do the clap, stamp pattern while you point: circle = clap, square = stamp.

Nobody is "out". If the class loses the pattern, stop, say it slowly together and start again.

Talk about it (5 min)

- "How did you know a clap came next?" (It kept going clap, stamp, clap, stamp; it repeats.)
- "Is circle, square, circle, square the same kind of pattern as clap, stamp, clap, stamp?" (Yes: two things taking turns.)

- "Can you find a pattern in our room?" Accept any repeating thing children notice (stripes, tiles, a border on a display). If none are easy to see, that is fine; the cards are enough.

✓ Closing check (2 min)

Lay red circle, blue square, blue square, red circle, blue square, blue square. Ask: "Which part repeats?" Children point or say.

Answer: circle, square, square (one red circle and two blue squares).

Vocabulary

pattern, repeat, next

Differentiation

- Support: stay with two-part (AB) patterns; let a child copy a buddy.
- Stretch: a three-thing pattern (clap, stamp, pat knees), or let a child lead a pattern for the class.

⚠ Safety

Check the space is clear before stamping. Stamping can be replaced with tapping a table or the knees.

Teacher notes

A pattern here is "something that repeats in a way you can predict". The word "core" for the repeating part is used in some classrooms; it is left out here, and "the part that repeats" is enough. Children who are deaf or hard of hearing can follow the movements; children with low vision can follow the sounds and the raised cards.

Lesson 2: What comes next? (25 min)

Back to the unit

Goal

Children say or show what comes next in AB, ABB and AAB picture patterns, and make a repeating pattern of their own.

Materials

- The large teacher set of pattern cards and the strip or floor tape.
- Per pair: 6 red circle cards and 6 blue square cards (raised cards for children who need them).

Steps

✎ Opening (3 min)

Clap, stamp, clap, stamp, clap... and stop. "What comes next?" (Stamp.) Say: "Yesterday we found patterns. Today we will guess what comes next, then make our own."

✎ Main activity: guess, then make (14 min)

1. **What comes next? (6 min).** Lay each pattern, read it together, then leave a gap and ask what goes in it. Let a child place the card.
    - Red circle, blue square, red circle, blue square, red circle, **?** (blue square)
    - Circle, square, square, circle, square, square, circle, **?** (square)
    - Circle, circle, square, circle, circle, square, circle, **?** (circle)
    - If children guess wrongly, read the pattern again slowly, tapping each card, and say the part that repeats aloud.
2. **Make your own (6 min).** Each pair makes a pattern with their cards that repeats at least twice. Walk round and ask: "What is the part that repeats?" Some pairs will copy one of yours; that is fine.
3. **Swap and say (2 min).** Each pair covers the last card of their pattern with a hand. The pair next to them says what is under the hand.

Talk about it (5 min)

- "How did you know what came next?" (We found the part that repeats and kept going.)
- "Circle, square, square: how is that different from circle, square?" (It has two squares each time, not one.)
- "Was it a pattern if the cards were just mixed up?" (No; nothing repeated, so we could not guess.)

✓ Closing check (3 min)

Lay circle, circle, square, circle, circle, square, circle, circle and ask: "What comes next?"

Answer: square (the part that repeats is circle, circle, square).

Vocabulary

pattern, repeat, next, guess

Differentiation

- Support: AB patterns only; place the next card together while saying the pattern aloud.
- Stretch: add the yellow triangle cards for a three-part pattern (circle, square, triangle), or make a pattern and say it as claps and stamps.

⚠ Safety

No special safety issues. Keep cards on tables or the carpet so they are not slipped on.

Teacher notes

Note which children can continue AB, ABB and AAB patterns; lesson 5 records this. Many children find AB easy and ABB or AAB harder at first. A pattern a child makes that repeats only once (circle, square) is a good start; ask them to make it "go again".

Lesson 3: The broken pattern (25 min)

Back to the unit

Goal

Children find the one card that does not fit in a broken pattern and fix it by swapping just that card.

Materials

- The large teacher set of pattern cards and the strip or floor tape.
- Per pair: 6 red circle cards and 6 blue square cards (raised cards for children who need them).

Steps

✎ Opening (3 min)

Clap, stamp, clap, stamp, stamp, stamp, clap, stamp. Pull a puzzled face. "Hmm. Did that sound right?" (No.) "Something went wrong in my pattern. Today we are going to find the part that went wrong and fix it."

✎ Main activity: find it, fix it (14 min)

1. **Spot the odd one (5 min).** Lay circle, square, circle, square, square, square, circle, square. Read it together, touching each card. Ask: "Which card does not fit?"
    - **Answer:** the 5th card (a square) should be a circle. Let a child swap it, then read the fixed pattern together.
    - Show children how to check: say the part that repeats ("circle, square") and walk along the cards two at a time until something is different.
2. **A harder one (3 min).** Lay circle, square, square, circle, circle, square, circle, square, square.
    - **Answer:** the 5th card (a circle) should be a square; the part that repeats is circle, square, square.
3. **Partner game (6 min).** In pairs, child A makes a circle, square pattern with 8 cards and says it aloud. A closes their eyes (or turns around) while B swaps **one** card for the other kind, using a spare card. A opens their eyes, finds the card that does not fit and fixes it. Swap roles.

Say: "When people make computer programs, a mistake like this is called a **bug**. Finding it and fixing it is a big part of the job." Make clear that a bug is not a real insect here, and that everyone makes them.

Talk about it (5 min)

- "How did you find the wrong card?" (We said the pattern and looked for where it stopped matching.)
- "Did we need to start the whole pattern again?" (No; we only changed the one wrong card.)
- "Is it bad to make a bug?" (No. Everybody makes them; the job is to find and fix them.)

✓ Closing check (3 min)

Lay circle, circle, square, square, circle, square, circle, circle, square. Ask: "Which card is the bug, and what should it be?"

Answer: the 4th card (a square) should be a circle; the part that repeats is circle, circle, square.

Vocabulary

pattern, wrong, fix, bug

Differentiation

- Support: AB patterns of 6 cards, with the wrong card near the start; let the child touch each card while the teacher says the pattern.
- Stretch: B swaps two cards; or A finds the bug in a sound pattern B claps.

⚠ Safety

No special safety issues. If a child is upset at having made a mistake in their own pattern, point out that the partner made the bug on purpose and finding it is the goal.

Teacher notes

This lesson uses one wrong card at a time so the idea stays clear. Gemini 4 Argon's term-2 unit fixes a wrong step on a floor grid; here the same idea is used with patterns, ready for lesson 4, where the "bug" is in a set of instructions.

Lesson 4: The tester's job (25 min)

Back to the unit

Goal

Children take turns as **programmer**, **bot** and **tester**: the programmer lays instruction cards, the bot follows them exactly, and the tester compares the result with the goal, finds the wrong card and swaps it.

Materials

Per group of three:

- One set of role badges: programmer, bot, tester.
- 4 red round blocks (short cylinders, stood on end) and 4 blue square blocks (cubes).
- Three card sets, each a goal strip plus six instruction cards with one wrong card (below), and three spare red circle and three spare blue square cards.

Card sets (R = red circle card or red round block; B = blue square card or blue square block):

Set	Goal strip	Instruction cards (with one bug)	Wrong card	Fix
A	R B R B R B	R B R B B B	5th	swap for R
B	R B B R B B	R B B R R B	5th	swap for B
C	R R B R R B	R R B B R B	4th	swap for R

A teacher demonstration set: goal R B R B R B; cards R B R R R B (the 4th card should be B).

Steps

✎ Opening (3 min)

Show the three badges. Say: "People who make computer programs often work as a team. Today we have three jobs. The **programmer** lays out the instruction cards. The **bot** does exactly what the cards say, one card at a time, no guessing. The **tester** checks that the result matches the goal, and if it does not, finds the wrong card."

✎ Main activity: build, test, fix (15 min)

1. **Demonstration (4 min).** With two children as programmer and bot, lay the demonstration cards R B R R R B in a row. The bot puts down one block for each card, left to right, in a line. You are the tester: hold the goal strip next to the line and touch both, one place at a time. "Red, red. Blue, blue. Red, red. Red... but the goal says blue!" Point to the 4th instruction card: "Here's the bug." Swap it for a blue square card, clear the blocks, and let the bot build again. Check again: it matches.
2. **Groups (11 min).** Give each group set A. The programmer lays the six instruction cards in a row (already in order, with the bug in them). The bot builds. The tester

compares, finds the wrong card and swaps it, and the bot builds again to check. Then rotate badges and do set B, then set C, so each child has each job once.
    - The bot follows the cards even when they look wrong; that is how the tester can find the bug.
    - A child with low vision can be the tester using raised goal strips and cards, comparing by touch: the round blocks and square blocks feel different, so the built line can be checked by hand, one place at a time.
    - If a group finishes early, the programmer makes their own goal strip and cards, with or without a bug, for the others.

Talk about it (4 min)

- "Why did the bot build the wrong line?" (The bot did exactly what the cards said, and one card was wrong.)
- "How did the tester find the bug?" (By comparing the line with the goal, one place at a time.)
- "After the swap, why did the bot build again?" (To check that the fix worked.)

✓ Closing check (3 min)

Show a goal strip R B B R B B and instruction cards R B R R B B. Ask: "Tester, which card is the bug, and what should it be?"

Answer: the 3rd card (a red circle) should be a blue square.

Vocabulary

programmer, bot, tester, instruction, bug, fix, check

Differentiation

- Support: work with an adult as one of the three jobs; use set A only; the tester points to each place while an adult says the colours.
- Stretch: two bugs in one set, or the programmer writes a new goal strip and the tester checks a friend's cards.

⚠ Safety

Use blocks too big to swallow; no beads or small parts. Clear blocks away between turns so the table stays tidy.

Teacher notes

The three roles come from CS Unplugged's Kidbots activities (see the unit's Sources); the card-and-block task is written for this unit. "Bot" means a robot that follows instructions; the

child playing the bot is a person doing a job, not someone being told off. The bug is always in the cards, never in the bot: this is the point to make.

Lesson 5: Pattern show (25 min)

Back to the unit

Goal

Children show a pattern they made and a bug they fixed, and the teacher finds out, one to one, what each child can do.

Materials

- Per pair: 6 red circle cards and 6 blue square cards (raised cards for children who need them).
- The large teacher set and the strip or floor tape.
- For the one-to-one check: 6 red circle and 6 blue square cards, and for part 5 a goal strip showing red, blue, red, blue, four instruction cards (one red circle, three blue squares) and a spare red circle card.
- A class list to note results.

Steps

✎ Opening (3 min)

Clap, stamp, clap, stamp with the class. Say: "This week we were pattern detectives, bug finders and testers. Today we show what we can do."

✎ Main activity: pattern show (15 min)

1. **Make (5 min).** Each pair makes a pattern of at least six cards that repeats at least twice.
2. **Show (7 min).** Pairs take turns to show the class. The class reads the pattern aloud (or claps it: circle = clap, square = stamp) and says what comes next.
3. **Bug hunt (3 min).** While the class closes their eyes, the teacher swaps one card in a pair's pattern. The class finds the bug and the pair fixes it.

Pairs who prefer not to show to the whole class can show the teacher or a small group instead.

Talk about it (4 min)

- "What is a pattern?" (Something that repeats, so you can guess what comes next.)
- "What is a bug?" (A wrong part, like a card that does not fit.)
- "What does a tester do?" (Checks the result against the goal and finds the wrong part.)

✓ Closing check (3 min)

Lay red circle, blue square, red circle, blue square, red circle, ? and ask the class what comes next.

Answer: blue square.

One-to-one check (about 3 minutes per child)

Do this during choosing time or at another time over the following days, not during the 25-minute lesson. Children can answer by speaking, signing, pointing, moving a card or directing an adult.

1. Clap, stamp, clap, stamp; ask the child to keep going. **Looks for:** one more clap, stamp (taps or nods are fine).
2. Lay circle, square, circle, square, circle and ask what comes next. **Answer:** square.
3. Lay circle, square, square, circle, square, square, circle and ask what comes next. **Answer:** square.
4. Lay circle, square, circle, square, circle, circle, circle, square and ask which card does not fit. **Answer:** the 6th card (a circle) should be a square.
5. Show a goal strip of red, blue, red, blue and instruction cards red, blue, blue, blue. Ask the child, as tester, to find the bug and fix it. **Answer:** swap the 3rd card for a red circle card.
6. Ask the child to make their own pattern. **Looks for:** at least six cards with a part that repeats at least twice.

Note which parts each child managed. A child who manages parts 1, 2 and 4 has the main ideas; parts 3, 5 and 6 are next steps. This check is for planning next term, not for a grade.

Vocabulary

pattern, repeat, next, bug, fix, tester

Differentiation

- Support: in the check, use AB patterns only and lay fewer cards; accept pointing.
- Stretch: ask the child to make a broken pattern for the teacher to fix, and to say how they would check the fix.

⚠ Safety

No special safety issues. Keep showing optional in form: showing a small group or the teacher counts.

Teacher notes

Results from part 4 and part 5 are a useful guide for grade 1 work on finding and fixing wrong steps. A child who finds the bug by touch, by sound or by colour alone has still found it.

Unit: Step-by-Step Robot Recipes and Floor-Grid Paths (Computing, Kindergarten)

> **Unreviewed AI draft.** Written by Gemini 4 Argon (2026-11-05). No human teacher has reviewed this unit. All content is CC0 1.0 Public Domain.

Overview

How does a toy robot or a computer know what to do? It cannot guess—a person must give it a clear, ordered list of steps called an **algorithm**.

Across five 30-minute unplugged movement and picture-card lessons, Kindergarten students (`ages 5–6`) learn the foundations of computational thinking through whole-body play. Students put 3-card daily routines into `First → Next → Last` order, guide a "Walking Robot" partner across a 3×3 floor grid using physical arrow cards (`↑ Step Forward`, `↺ Turn Left`, `↻ Turn Right`), notice when a missing or extra arrow makes the robot miss the target (**a bug**), act out simple action patterns (`Clap, Tap, Clap, Tap`), and press paper "buttons" to make a partner perform a matching sound or motion (connecting to Kindergarten Science: Pushes and Pulls).

Prior knowledge

- No reading or writing is required; all activities use picture cards, arrows, and spoken/movement commands.
- Students can count to 5 and follow one-step classroom directions.
- Helpful cross-link: Pushes and pulls (Science, Kindergarten) explores how pushing a button or object causes a motion.
- Leads to: Symbols, signals, sorting, and step-by-step recipes (Computing, Grade 1) and Computing & systems progression.

Learning goals

By the end of this unit, a student can:

1. Arrange 3 picture cards into **`First → Next → Last`** order for a familiar routine and tell what happens if the first and last cards are switched (Lesson 1).
2. Follow a 3-arrow floor-grid path (`↑ Step Forward` one square at a time) without jumping over squares (Lesson 2).
3. Spot the **bug** (mistake) when a 3-arrow path lands on a mud-puddle square instead of the treasure star, and swap in the card that fixes it (Lesson 3).
4. Continue a 2-part repeating action pattern (`Clap, Stomp, Clap, Stomp, ...`) and name the core part that repeats (Lesson 4).
5. Match a button press (**input**) to the action or sound a machine makes (**output**) in a partner game (Lesson 5).

Lesson sequence

Lesson	Title	Time	Core idea
Lesson 1	First, Next, Last: Putting Daily Routines in Order	30 min	Instructions happen one step at a time in order (**sequence**)
Lesson 2	Walking the Floor Grid: One Square at a Time	30 min	A robot follows arrow cards (↑) literally, moving one square per card
Lesson 3	Oops, Wrong Square! Fixing a Bug on the Rug	30 min	When a robot lands in the wrong place, we check the arrow cards and fix the **bug**
Lesson 4	Do It Again! Repeating Action Patterns	30 min	Many dances, songs, and computer tasks repeat a small pattern over and over
Lesson 5	Push a Button, Make It Go: Buttons and Actions	30 min	Pushing a button gives a machine an instruction to start an action or sound

Materials for the whole unit

- Masking tape or painter's tape to mark a 3×3 grid of large squares on the classroom floor (each square big enough for a child to stand inside)
- Large printed or hand-drawn picture cards:
- 3-step routine sets (Washing Hands, Building a Snowman, Getting Ready for Rain)
- 6 large Arrow Cards (`↑ Step Forward`, `↺ Turn toward the Window`, `↻ Turn toward the Door`)
- 1 paper **Gold Star** (goal) and 1 paper **Mud Puddle** (obstacle)
- 3 paper "Button Circles" (Blue Star Button, Yellow Bell Button, Purple Frog Button) and 1 large `[ □ PUSH BUTTON ]` action card (Lesson 5)
- Large tabletop robot tokens (oversized wooden blocks or plush toys at least 5 cm wide for Lesson 3's pair strip; avoid coins, small erasers, or small linking cubes that could pose a choking hazard for 5-year-olds)

Assessment summary

Each lesson finishes with a 3-question oral, thumbs-up/thumbs-down, or physical card-pointing check with worked teacher answers. In Lesson 5, students guide a plush toy or classmate across a 3-square path to press a paper button and trigger the matching class action.

Sources

These references provide teacher background for the concepts introduced in Kindergarten. All links were checked to load on 2026-11-05.

- Sequence (ordered list of elements or steps): https://en.wikipedia.org/wiki/Sequence — background for Lesson 1's `First → Next → Last` ordering.
- Algorithm (step-by-step procedure): https://en.wikipedia.org/wiki/Algorithm — background for Lessons 1–2.
- Grid (spatial index / square floor grid navigation): https://en.wikipedia.org/wiki/Grid_(spatial_index) — background for Lesson 2's 3×3 floor-grid movement.
- Debugging (finding and correcting faults in instructions): https://en.wikipedia.org/wiki/Debugging — background for Lesson 3's arrow-card repair.
- Pattern (repeating regularity in actions or shapes): https://en.wikipedia.org/wiki/Pattern — background for Lesson 4's repeating movement patterns.

- Bell, T., Witten, I. H., & Fellows, M. (2015). CS Unplugged (pedagogical reference for screen-free early computing activities; all lesson text and games in this unit are original CC0 work): https://www.csunplugged.org/

Known gaps and cautions

- **Unreviewed AI draft:** This unit has not yet been reviewed by a human Kindergarten educator or tested with 5-year-old students.
- **Left/Right vs. Classroom Landmarks (Lesson 2):** Many 5-year-olds are still developing automatic left/right recall. In Lessons 2 and 3, pair turn arrows with concrete **classroom wall landmarks** (for example, "Turn toward the Window wall" vs. "Turn toward the Bookshelf wall", or tape a blue circle on the robot's left shoe and a yellow square on the right shoe).
- **Safe spacing on the floor grid:** Have only one "Robot" student stand inside the 3×3 tape grid at a time while the rest of the group sits around the perimeter as "Programmers" and "Bug Checkers" so students do not bump into each other.

Lesson 1: First, Next, Last — Putting Daily Routines in Order

- **Unit:** Step-by-Step Robot Recipes and Floor-Grid Paths (Computing, Kindergarten)
- **Time:** 30 minutes
- **Grouping:** Whole class on the circle rug, then pairs

Learning objective

Students will arrange 3 picture cards into **`First → Next → Last`** order for an everyday routine and explain what happens when the order is mixed up.

Materials

- 3 large demonstration picture cards for **Building a 3-Ball Snowman**:
- **Card A (First):** Roll a big bottom snowball on the ground
- **Card B (Next):** Lift a middle snowball on top of the big one
- **Card C (Last):** Put a small head snowball and carrot nose on top
- Per pair of students: a 3-card picture set for **Getting Ready for Rain**:
- Put on rain boots and raincoat
- Open the umbrella outside
- Walk through the rain staying dry

Vocabulary

- **First:** The step that happens at the very beginning (`Step 1`).
- **Next:** The step that happens in the middle (`Step 2`).
- **Last:** The step that finishes the job (`Step 3`).
- **Recipe (Algorithm):** A list of steps in the right order to do a job.

Lesson flow

✎ 1. Opening: The Upside-Down Snowman (6 min)

1. Hold up the 3 Snowman cards in the **wrong order**:
2. **First:** Put the tiny head snowball in the air (`Card C`)!
3. Pretend to hold a tiny snowball high in the air with nothing underneath it and let it drop ("Plop!").
4. Ask: "Why did my snowman head fall on the ground? Which snowball has to go **First** on the bottom so it can hold up the others?"
5. Students point to the big bottom snowball (`Card A`).

✎ 2. Main activity: Ordering `First → Next → Last` (15 min)

1. **Whole-class Snowman Line-Up (5 min):**
2. Invite 3 volunteers to hold `Card A`, `Card B`, and `Card C` at the front of the rug.

3. The class helps them stand in left-to-right order: `First` **(Big bottom ball)** → `Next` **(Middle ball)** → `Last` **(Head and nose)**.
4. Everyone acts out rolling the big ball, lifting the middle ball, and placing the head and carrot nose.
5. **Partner Rainy-Day Sort (10 min):**
6. Hand each pair the 3 **Getting Ready for Rain** picture cards shuffled face-up.
7. Partners talk together and line their 3 cards up from left to right:
    1. **First:** Put on boots and coat inside.
    2. **Next:** Open the umbrella at the door.
    3. **Last:** Walk in the rain staying dry.
8. Ask pairs to test a silly swap: "What happens if you do Card 3 (Walk in the rain) **First**, and Card 1 (Put on raincoat) **Last**?" (You get soaked before your coat is on!)

✓ 3. Discussion questions (4 min)

- **Question 1:** "When you eat a bowl of cereal, which comes **First**: pouring the cereal and milk into the bowl, or scooping with your spoon?"
- Example good answer: Pouring the cereal and milk into the bowl comes **First**, or else your spoon scoops an empty bowl!
- **Question 2:** "Why do machines and robots need their steps in the right order?"
- Example good answer: Because a robot only does the exact step you tell it, so mixed-up steps make a silly mess.

✓ 4. Closing check (5 min)

Read 3 quick checks; students point or hold up 1, 2, or 3 fingers:

1. Look at these 3 pictures for painting a picture:
2. **(1)** Wash the paint off the brush at the end
3. **(2)** Dip the clean brush into the paint cup
4. **(3)** Paint a bright sun on the paper Which picture happens **First**?
5. Which of those 3 pictures happens **Last**?
6. What happens if you wash the brush and put it away **before** you paint on the paper?

Worked answers for closing check

1. **(2) Dip the clean brush into the paint cup** happens **First**.
2. **(1) Wash the paint off the brush at the end** happens **Last**.
3. The paper stays blank because you put the brush away before painting!

Differentiation

- **Extra support:** Place a 3-box mat labeled with dots (`•`, `••`, `•••`) on the floor so students can place one card in each box from left to right.
- **Extra challenge:** Give pairs a 4th blank card to draw what happens after coming back inside from the rain (Take off wet boots and close the umbrella).

Teacher notes

- **Common misconception:** Some students place cards from right to left or in a vertical pile. Point to the green dot on the left side of the rug/table as the starting spot so everyone reads the sequence in the same direction.

Lesson 2: Walking the Floor Grid — One Square at a Time

- **Unit:** Step-by-Step Robot Recipes and Floor-Grid Paths (Computing, Kindergarten)
- **Time:** 30 minutes
- **Grouping:** Whole class seated around a 3×3 floor tape grid

Learning objective

Students will guide a classmate ("the Walking Robot") from a Start square to a Gold Star square on a 3×3 floor grid by lining up `↑ Step Forward` and `Turn` arrow cards one step at a time.

Materials

- A 3×3 floor grid made with painter's tape on the rug: `[ ★ ] [ ] [ ]` (Row 3: Top — ★ starts at Top-Left for Opening & Path 1; moves to Row 2 Col 2 for Path 2 and Top-Right Row 3 Col 3 for Path 3) `[ ] [ ] [ ]` (Row 2: Middle) `[ R ] [ ] [ ]` (Row 1: Bottom — R = Robot Start at Bottom-Left facing UP ↑)
- 6 large Arrow Cards:
- 4 cards showing `↑ Step Forward 1 Square`
- 2 cards showing `↻ Turn Toward the Door (Right)` / `↺ Turn Toward the Window (Left)`
- 1 paper **Gold Star (★)**

Vocabulary

- **Grid:** Squares lined up in neat rows so we can count exact steps.
- **Command Card:** An arrow card that tells the robot one exact move.
- **Step Forward (↑):** Move 1 square straight ahead in the direction your toes are pointing.
- **Turn In Place (↺ / ↻):** Spin your feet inside the **same square** to face a new wall (without stepping into a new square yet!).

Lesson flow

✎ 1. Opening: How Does a Floor Robot Move? (6 min)

1. Stand inside the bottom-left corner square `[R]` of the 3×3 tape grid with your toes pointing toward the top row. Place the **Gold Star (★)** two squares straight ahead in the top-left corner.
2. Ask: "If I want to walk from my Start square to the Gold Star without stepping outside the lines, how many squares forward do I need to step?"
3. Count together as you step: `1` **step forward** (into the middle-left square), `2` **steps forward** (onto the Gold Star!).
4. Show that **2** `↑ Step Forward` **arrow cards** (`[ ↑ ] [ ↑ ]`) write down that exact recipe!

✎ 2. Main activity: Human Robot & Programmer Teams (15 min)

1. **Practice the "Turn in Place" Rule (5 min):**
2. Have all students stand up on their spot around the rug.
3. Hold up `↑ Step Forward`: everyone takes 1 small step forward (and steps back).
4. Hold up `↻ Turn Toward the Door`: everyone pivots their feet inside their spot so their nose and toes point toward the classroom door—**without** stepping forward!
5. Emphasize: "A turn card only spins our toes inside our square. To move into the next square, we still need a `↑ Step Forward` card!"
6. **3-Challenge Grid Game (10 min):**
7. For each round, choose 1 **Robot** (stands on `[R]` facing North/Up) and 2 **Programmers** (lay the arrow cards in a row beside the grid while the class checks):
    - **Path 1 (Straight Line):** Star is 2 squares straight ahead (`Row 3, Col 1`).
    - Recipe: `[ ↑ ] [ ↑ ]` (2 cards).
    - **Path 2 (One Corner Turn):** Move the Star to `Row 2, Col 2` (1 square up, 1 square toward the door/right).
    - Recipe: `[ ↑ ] [ ↻ Turn Toward Door ] [ ↑ ]` (3 cards).
    - **Path 3 (All the Way to the Top-Right Corner ★):** Star is at `Row 3, Col 3` (2 squares up, 2 squares right).
    - Recipe: `[ ↑ ] [ ↑ ] [ ↻ Turn Toward Door ] [ ↑ ] [ ↑ ]` (5 cards).
8. For each path, the class chants the cards in order while the Robot performs one card per chant.

✓ 3. Discussion questions (4 min)

- **Question 1:** "In Path 2, why did we need THREE cards (`↑`, `↻ Turn`, `↑`) even though the Robot only stepped into TWO new squares?"
- Example good answer: Because one card had to turn the Robot's toes toward the door before the Robot could step sideways into the Star square!
- **Question 2:** "Is there a second road of squares that also reaches the Top-Right Star (`Row 3, Col 3`)?"
- Example good answer: Yes! You could turn toward the door first, walk 2 squares across the bottom row, turn up, and walk 2 squares up!

✓ 4. Closing check (5 min)

Place the Robot on the bottom-left square facing **Up (`↑`)** and place the **Gold Star (`★`)** just **1 square straight ahead** (`Row 2, Col 1`).

1. How many `↑ Step Forward` cards does the Robot need to land right on the Gold Star?
2. What happens if we give the Robot **two** `↑ Step Forward` cards (`[ ↑ ] [ ↑ ]`) instead of one?
3. When the Robot sees a `↻ Turn` card, does the Robot move into a new square or spin its toes inside the same square?

Worked answers for closing check

1. **One card** (1 `↑ Step Forward` card) to reach the Gold Star 1 square ahead.
2. **Two cards (`[ ↑ ] [ ↑ ]`):** The Robot walks **right past** the Gold Star into the top-left square (`Row 3, Col 1`)!
3. **Turn card (↻):** It **spins its toes inside the same square** (it does not step into a new square).

Differentiation

- **Extra support:** Give the Robot a paper steering wheel or tape a big paper arrow onto the top of their shoes so everyone can see which way the Robot is facing before reading the next card.
- **Extra challenge:** Place a plush puppy on one square as a "Sleeping Puppy" obstacle and ask students to build a path to the Star that walks around the puppy without waking it up.

⚠ Safety

- Walk slowly one square at a time inside the tape grid; never run or jump across squares.

Teacher notes

- **Common misconception:** Just like in Grade 3 grid algorithms, young children naturally combine "Turn and step" into one motion. Practicing **"Glue your heels to your square while you turn"** makes the distinction between `Turn` and `Step Forward` crystal clear and fun.

Lesson 3: Oops, Wrong Square! — Fixing a Bug on the Rug

- **Unit:** Step-by-Step Robot Recipes and Floor-Grid Paths (Computing, Kindergarten)
- **Time:** 30 minutes
- **Grouping:** Whole class around the 3×3 floor tape grid, then pairs

Learning objective

Students will watch a Robot follow a broken arrow-card path, point to the exact card that caused the Robot to miss the Gold Star or step in a Mud Puddle (**a bug**), and fix the path.

Materials

- The 3×3 floor tape grid from Lesson 2
- 6 large Arrow Cards (`↑ Step Forward`, `↻ Turn Toward Door`, `↺ Turn Toward Window`)
- 1 paper **Gold Star (★)** and 1 brown paper **Mud Puddle (▯)**
- Per pair (for Mystery 3): a 3-square paper strip (`[ Start ] [ Middle ] [ ★ ]`), 3 paper `[ ↑ ]` cards, and 1 **large wooden block or plush robot token** (at least 5 cm wide; do not use coins or small erasers)

Vocabulary

- **Bug:** A mistake in our arrow cards that sends the Robot to the wrong square.
- **Fix (Debug):** Finding the wrong card and trading it for the right card so the Robot reaches the goal.
- **Test:** Having the Robot walk the cards from the beginning to check if our fix worked.

Lesson flow

✎ 1. Opening: The Mud-Puddle Mistake (6 min)

1. Set up the 3×3 floor grid with:
2. **Robot (R)** at Bottom-Left (`Row 1, Col 1`), facing **Up (↑)**
3. **Gold Star (★)** at Middle-Left (`Row 2, Col 1`, 1 square straight ahead)
4. **Mud Puddle (▯)** at Top-Left (`Row 3, Col 1`, 2 squares straight ahead)
5. Lay down **two** `↑ Step Forward` cards: `[ ↑ ] [ ↑ ]`.
6. Act out the Robot:
7. Card 1 (↑): Step onto the Gold Star (`Row 2, Col 1`)—"Yay!"
8. Card 2 (↑): "Wait, there is still another card! Robots must follow every card!" Step forward off the Star and SPLASH! right into the Mud Puddle (`Row 3, Col 1`)!
9. Ask: "Oh no! Why did the Robot step into the Mud Puddle? Which card was the **bug**?"
10. Students point to the **extra second ↑ card**! Take away the second ↑ card and **test** again—now the Robot stops safely on the Gold Star.

✎ 2. Main activity: Three Bug-Fix Mysteries (15 min)

Invite student **Bug Detectives** to solve three broken programs on the rug:

1. **Mystery 1 — The Too-Short Recipe (Missing Card Bug):**
2. **Goal (★):** Top-Left (`Row 3, Col 1`, 2 squares straight ahead from Start).
3. **Broken Cards on Rug:** `[ ↑ ]` (only 1 card!).
4. **Test:** Robot takes 1 step to the middle square and stops one square short of the Star.
5. **How to Fix:** Add one more **`[ ↑ ]`** card at the end (`[ ↑ ] [ ↑ ]`) and re-test!
6. **Mystery 2 — The Wrong-Way Turn Bug:**
7. **Robot (R):** Starts in the **Bottom-Middle square (`Row 1, Col 2`)**, facing **Up (↑)**.
8. **Goal (★):** Middle-Right square (`Row 2, Col 3`, toward the Door).
9. **Mud Puddle (▯):** Middle-Left square (`Row 2, Col 1`, toward the Window).
10. **Broken Cards on Rug:** `[ ↑ ] [ ↺ Turn Toward Window ] [ ↑ ]`.
11. **Test:** Robot steps up to the center square, turns toward the Window, and steps into the Mud Puddle!
12. **How to Fix:** Which card was the bug? **Card 2 (`↺ Turn Toward Window`)!** Swap Card 2 for **`[ ↻ Turn Toward Door ]`**, then re-test from the start to watch the Robot land on the Gold Star!
13. **Mystery 3 — Pair Tabletop Bug Fix (5 min):**
14. Each pair gets a small 3-square strip drawn on paper (`[ Start ] [ Middle ] [ ★ ]`) and 3 paper arrow cards placed on the side: `[ ↑ ] [ ↑ ] [ ↑ ]`.
15. Partners slide their large wooden block or plush robot token along the 3 squares, see that 3 steps goes off the end of the paper strip, and remove 1 `↑` card so their token lands right on `[ ★ ]`.

✓ 3. Discussion questions (4 min)

- **Question 1:** "When our Robot stepped in the Mud Puddle, was the Robot being naughty, or was it just following our cards?"
- Example good answer: The Robot was doing its job following the cards! The mistake (**bug**) was in the cards, not the Robot.
- **Question 2:** "Why do we always walk the path again from the Start square after we change a card?"
- Example good answer: To **test** our fix and make sure the new cards really reach the Gold Star!

✓ 4. Closing check (5 min)

1. A Robot needs to move **2 squares forward** to reach the Gold Star (`[ Start ] → [ Square ] → [ ★ ]`), but the programmer only put down **1 `↑` card**. Where will the Robot stop, and how do you fix the bug?
2. What do computer scientists call a mistake in a list of instructions?
3. After you fix a bug in your arrow cards, what should you do next to be sure your fix works?

Worked answers for closing check

1. The Robot stops **1 square too early** (on the middle square). Fix it by **adding one more `↑ Step Forward` card** (`[ ↑ ] [ ↑ ]`).
2. A **bug**.
3. **Test it** by having the Robot walk the arrow cards from the Start square.

Differentiation

- **Extra support:** Touch each arrow card with a pointer stick at the exact moment the Robot takes that step so students see the 1-to-1 match between the card on the floor and the Robot's footstep.
- **Extra challenge:** Give pairs a path with **two** bugs (wrong turn AND one missing forward step) to fix one bug at a time.

⚠ Safety

- Use only **large wooden blocks, plush toys, or large paper cards** (at least 5 cm across) as tabletop robot tokens; never use coins, beads, or small erasers that could be a choking hazard for 5-year-olds.
- Keep only one student walking inside the 3×3 floor tape grid at a time while classmates sit around the outside edge.

Teacher notes

- **Building a warm debugging culture:** Celebrate bugs with a cheerful class phrase like "Hooray, we found a bug! Now we can fix it!" so 5-year-olds view mistakes as normal, fixable puzzles rather than personal failures.

Lesson 4: Do It Again! — Repeating Action Patterns

- **Unit:** Step-by-Step Robot Recipes and Floor-Grid Paths (Computing, Kindergarten)
- **Time:** 30 minutes
- **Grouping:** Whole class on the rug, then pairs

Learning objective

Students will identify the repeating unit in a 2-step or 3-step movement/picture **pattern**, perform a pattern a counted number of times (**a loop**), and say what action comes next.

Materials

- Picture cards for action moves:
- **Clap Hands (👏)**
- **Pat Knees (🙌)**
- **Touch Head (🗣️)**
- **Jump Up (⬆️)**
- Number cards `2` and `3` (to show "Do this pattern 2 times" or "3 times")

Vocabulary

- **Pattern:** Steps or pictures that repeat in the exact same order over and over.
- **Repeat (Loop):** Doing the same small group of steps again and again.

Lesson flow

✎ 1. Opening: The Echo Dance (6 min)

1. Without explaining first, perform a steady, slow movement pattern while saying the words: `Clap – Pat Knees – Clap – Pat Knees – Clap – Pat Knees ...`
2. Pause with your hands in the air after `Clap` and ask: "What move comes next?" (`Pat Knees`!)
3. Tape the 6 picture cards on the board: `[ 👏 Clap ] [ 🙌 Pat ] [ 👏 Clap ] [ 🙌 Pat ] [ 👏 Clap ] [ 🙌 Pat ]`
4. Ask: "Look at this long line of 6 cards! Which two cards keep happening over and over?"
5. Draw a big circle around the first two cards **`( [ 👏 Clap ] [ 🙌 Pat ] )`** and put the number **`3`** beside the circle: "Do *`Clap, Pat`* **3 times**!"

✎ 2. Main activity: Shrinking Long Recipes with "Repeat" (15 min)

1. **Counted Loops with Our Fingers (5 min):**
2. Show how we can do a 2-card pattern **`3 times`**:
    - Pattern inside the circle: **`( [ 🗣️ Touch Head ] → [ 👏 Clap ] )`**
    - Number card outside: **`3 times`**

3. One student stands by the board as the **Counter**, holding up 1 finger for Round 1 (`Touch Head, Clap`), 2 fingers for Round 2 (`Touch Head, Clap`), and 3 fingers for Round 3 (`Touch Head, Clap` — "STOP!").
4. **Grid Walk Connection (4 min):**
5. Look back at our floor tape grid: if a Robot wants to walk **3 squares straight ahead**, instead of saying "Step forward, Step forward, Step forward", we can circle **one** `[ ↑ Step Forward ]` card and put the number `3` next to it ("Step forward 3 times").
6. **Partner Dance-Loop Inventors (6 min):**
7. Each pair picks **2 action cards** (for example, `[ Pat Knees ]` and `[ Jump Up ]`) and a number card (`2` or `3`).
8. Partner A points to the cards and counts the rounds (`1... 2... 3!`) while Partner B acts out the repeating robot dance, then they switch!

✓ 3. Discussion questions (4 min)

- **Question 1:** "Why is it easier to say 'Clap and Pat 3 times' than to tape 6 separate cards across the whole wall?"
- Example good answer: Because it uses fewer cards and takes less space while telling the robot the exact same dance!
- **Question 2:** "Where else in our day do we do the same small pattern over and over?"
- Example good answer: Walking (`Left foot, Right foot, Left foot, Right foot`), brushing teeth (`Up, Down, Up, Down`), or singing the chorus of a song!

✓ 4. Closing check (5 min)

1. Look at this action pattern: **`Clap – Stomp – Clap – Stomp – Clap – ?`** What action comes next?
2. If our circled pattern is **`( Touch Nose → Wave Hand )`** and the number card says **`2 times`**, how many times will you wave your hand in total?
3. What does the word **repeat** mean?

Worked answers for closing check

1. **`Stomp`** comes next.
2. **2 times** (`Touch Nose, Wave Hand` [1], `Touch Nose, Wave Hand` [2]).
3. To do the same step or group of steps **again**.

Differentiation

- **Extra support:** Use **large two-color paper cards or oversized wooden blocks** (`Red, Blue, Red, Blue, Red, Blue`, at least 5 cm wide; avoid small linking cubes or beads that could be a choking hazard) that students can group into three matching `(Red-Blue)` pairs to see and hold the repeating unit.
- **Extra challenge:** Try a **3-step pattern** (`Clap → Pat Knees → Jump`) repeated `2 times` (6 moves total).

⚠ Safety

- Ensure students have an arm's-length of clear floor space around them before doing standing movement patterns (`Pat Knees`, `Jump Up`), and offer seated hand/card alternatives for any student who prefers not to jump.
- Use only large paper cards or oversized wooden blocks (`≥ 5 cm`); do not use small linking cubes or beads with 5-year-olds.

Teacher notes

- **Connection to Grade 2 and Grade 3:** This physical "Circle the pattern + Number card" notation prepares students directly for Grade 2 repeating pattern blocks and Grade 3 `REPEAT n TIMES` loops.

Lesson 5: Push a Button, Make It Go — Buttons and Actions

- **Unit:** Step-by-Step Robot Recipes and Floor-Grid Paths (Computing, Kindergarten)
- **Time:** 30 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will connect a physical **button push** (input) to the specific **sound or action** (output) a machine performs, and combine a 3-square floor-grid walk with a button press in the unit finale.

Materials

- 3 large paper "Buttons" taped to the board or easel:
- **Blue Star Button (⋆):** Makes the machine do **2 Star Jumps**
- **Yellow Bell Button (□):** Makes the machine sing **"Ding-Dong!"**
- **Purple Frog Button (□):** Makes the machine say **"Ribbit!" and crouch low**
- The 3×3 floor tape grid and Arrow Cards (↑, ↺, ↻) from Lessons 2–3
- 1 large `[ □ PUSH BUTTON ]` command card (tells the Robot to press the paper button on its square)

Vocabulary

- **Button (Input):** Something you push or tap to tell a machine what to do.
- **Action / Sound (Output):** What the machine does, shows, or plays after you push the button.

Lesson flow

✎ 1. Opening: Pushes That Send a Message (6 min)

1. Connect to Kindergarten Science: Pushes and Pulls:
2. In Science, we learned that a **push** moves an object away from you—like pushing a toy car across the floor.
3. Ask: "What happens when you **push** the doorbell button beside someone's front door? Does the house roll down the street, or does something else happen?"
4. Students answer: It rings a bell ("Ding-dong!") inside the house!
5. Explain: On machines and computers, pushing a **button** sends a message telling the machine which **action or sound** to do!

✎ 2. Main activity: The Three-Button Machine & Grid Finale (15 min)

1. **Whole-Class Sound & Action Machine (6 min):**
2. Point to the 3 paper buttons on the board (**Blue Star ⋆**, **Yellow Bell □**, **Purple Frog □**).

3. Tell the class: "All of you are the Classroom Computer! Do NOT make a sound until a human finger pushes one of your buttons!"
4. Invite a student up to gently press:
    - **Yellow Bell Button (🔔)** → Class sings "Ding-dong!"
    - **Purple Frog Button (🐸)** → Class says "Ribbit!" and crouches
    - **Blue Star Button (★)** → Class does 2 Star Jumps
5. Ask: "Why didn't the computer say 'Ribbit' when I pushed the Yellow Bell button?" (Because each button has its own matching rule!)
6. **Partner Button Pads (4 min):**
7. Pairs draw 2 buttons on a sheet of paper (for example, a **Cat Button** and a **Drum Button**).
8. Partner A taps one paper button; Partner B acts out the matching sound or move, then they switch.
9. **Unit Finale — Walk the Grid and Push the Button! (5 min):**
10. Place the **Yellow Bell Button (🔔)** on one corner of the 3×3 floor grid and the **Purple Frog Button (🐸)** on another corner.
11. Show the new `[ 🔔 PUSH BUTTON ]` command card, then together lay down the cards (`[ ↑ ]` `[ ↑ ]` `[ 🔔 PUSH BUTTON ]`) to guide the Robot 2 squares forward onto a button and press it. When the Robot reads `[ 🔔 PUSH BUTTON ]` and taps the button on its square, the whole class performs that button's sound!

✓ 3. Discussion questions (4 min)

- **Question 1:** "Name one real button you push at home or school, and tell what happens right after you push it."
- Example good answer: Pushing the wall switch turns on the classroom lights; pushing the crosswalk button makes the walk sign light up; pushing the water fountain button makes water bubble up.
- **Question 2:** "What did we learn across all five of our Robot Recipe lessons?"
- Example good answer: We learned to put steps in `First, Next, Last` order (Lesson 1), follow arrow cards on a grid (Lesson 2), fix **bugs** when we miss the star (Lesson 3), **repeat** patterns (Lesson 4), and push **buttons** to make actions happen (Lesson 5)!

✓ 4. Closing check (5 min)

1. In our classroom game, **Yellow Bell Button = "Ding-Dong!"** and **Purple Frog Button = "Ribbit!"**. If a student pushes the **Yellow Bell Button**, what sound comes out?
2. Put these 3 steps for using a toy music box in `First → Next → Last` order:
3. **(A)** Listen to the music play
4. **(B)** Walk over to the table where the music box sits
5. **(C)** Push the green Start button on top of the box
6. On our floor grid, the Robot is 1 square away from the Blue Star Button, facing straight at it. Which card does the Robot need to reach the button square: `↑ Step Forward` or `↻ Turn`?

Worked answers for closing check

1. **"Ding-Dong!"**
2. **First: (B)** Walk over to the table → **Next: (C)** Push the green Start button → **Last: (A)** Listen to the music play.
3. `↑ Step Forward`.

Differentiation

- **Extra support:** Use real tactile props (such as a tap-light puck or three upside-down paper cups of different colors/shapes) for students to press.
- **Extra challenge:** Add a **"Power Switch (ON / OFF)"** paper card next to the 3 buttons: if the Power Switch is turned to `OFF`, pressing any of the 3 buttons produces **silence** until a programmer flips the Power Switch back to `ON`!

Teacher notes

- **Preparing for Grade 1 and Grade 3:** This lesson plants the seed for Grade 1's two-state signals (`ON / OFF`) and Grade 3's formal **Input → Processing → Output** model through playful, concrete cause-and-effect.

Unit: Symbols, Signals, Sorting, and Step-by-Step Recipes (Computing, Grade 1)

> **Unreviewed AI draft.** Written by Gemini 4 Argon (2026-11-05). No human teacher has reviewed this unit. All content is CC0 1.0 Public Domain.

Overview

Before young children touch a keyboard, they already use the core building blocks of computing every day: they follow **step-by-step recipes** to get ready for school, read **symbols** on classroom labels, answer **yes/no questions** with two-state **signals** (thumbs up or thumbs down, red or green cards), and **sort** objects into groups using a clear rule.

Across five 35-minute unplugged lessons, Grade 1 students explore how humans and machines represent and organize information without needing any screens or electricity. Students act out step-by-step morning routines and spot out-of-order steps, invent picture symbols to label classroom bins, send silent two-state signals across the rug using two-color cards and flashlights, sort buttons and leaf cards by a single attribute rule (cross-linked with Grade 1 Science's Plants: parts, needs and growth), and distinguish tools that store or send information from tools that only do physical work.

Prior knowledge

- Students can count to 10, recognize basic shapes (circle, square, triangle) and colors, and take turns in a partner game.
- Helpful cross-links:
- Blending and decoding (Language and literacy, Grade 1) explores how written letter symbols stand for spoken sounds.
- Plants: parts, needs and growth (Science, Grade 1) observes leaf shapes and plant parts, which Lesson 4 uses as an unplugged sorting set.
- Leads to: Inputs, outputs, loops, and debugging (Computing, Grade 3) and Computing & systems progression.

Learning goals

By the end of this unit, a student can:

1. Put a 4-card everyday routine in exact order, act it out literally, and explain what goes wrong when two steps are swapped (Lesson 1).
2. Match and draw a simple **symbol** (icon) that stands for a classroom object or action, and explain why everyone using the symbol must agree on its meaning (Lesson 2).
3. Answer a **yes/no question** across the room using a two-state **signal** (such as red/green cards or 1 clap / 2 claps) without speaking aloud (Lesson 3).
4. **Sort** a mixed collection of 8 to 10 items into two groups using a single clear rule (attribute), and guess a partner's secret sorting rule by inspecting their groups (Lesson 4).
5. Decide whether an everyday object is an **information tool** (stores, shows, or sends messages) or a **non-information tool**, and state what kind of information it handles (Lesson 5).

Lesson sequence

Lesson	Title	Time	Core idea
Lesson 1	First This, Then That: Step-by-Step Recipes and Order	35 min	The order of steps in a routine (**algorithm**) matters; swapping two steps changes the result
Lesson 2	Pictures That Mean Something: Symbols and Shared Codes	35 min	A **symbol** is a simple mark or picture that stands for an idea or action when people agree on the rule
Lesson 3	Red Card, Green Card: Two-State Signals for Yes and No	35 min	A two-state **signal** (on/off, green/red, up/down) can send a clear **yes/no** message across a distance
Lesson 4	One Rule at a Time: Sorting Objects by Attributes	35 min	Computers and people organize data by checking one **attribute** (color, shape, size, or hole count) at a time
Lesson 5	Tools That Hold or Send Messages: Information Around Us	35 min	Some tools store, change, or send **information** (words, numbers, pictures, sounds), while others only move or hold physical things

Materials for the whole unit

No computers, tablets, or batteries are required (one optional teacher flashlight in Lesson 3):

- Paper, crayons or markers, and 4–8 index cards per student pair
- One two-sided card per student (colored green on one side and red with a black stripe on the other so color-blind students can distinguish both sides by pattern as well as color)
- Sorting sets for pairs in Lesson 4: an envelope of 10 large pre-made paper cutouts (`at least 5 cm across`, with 6 four-dot pieces and 4 two-dot pieces across Circle, Square, and Leaf shapes in Blue and Yellow) plus 2 extra test cutouts per pair

Assessment summary

Lessons 1–4 each conclude with a 3-question oral, pointing, or picture-card exit check with worked teacher answers. Lesson 5 concludes with a 4-question end-of-unit synthesis check (covering step order, symbols and two-state signals, single-attribute sorting, and information tools) with worked teacher answers.

Sources

These references provide background on the concepts introduced in Grade 1. All links were checked to load on 2026-11-05.

- Algorithm (step-by-step procedure): https://en.wikipedia.org/wiki/Algorithm — background for Lesson 1's ordered routine cards.
- Symbol (mark or sign representing an idea or object): https://en.wikipedia.org/wiki/Symbol — background for Lesson 2's classroom icon design and shared meaning.
- Traffic light (standard color and position signals): https://en.wikipedia.org/wiki/Traffic_light — real-world example of agreed-upon visual signals in Lessons 2 and 3.
- Signal (conveying information through a changing physical state): https://en.wikipedia.org/wiki/Signal — background for Lesson 3's two-state yes/no card and clap signals.
- Sorting (arranging or grouping items systematically by a criterion): https://en.wikipedia.org/wiki/Sorting — background for Lesson 4's single-attribute classification activities.

- Bell, T., Witten, I. H., & Fellows, M. (2015). CS Unplugged (general pedagogical inspiration for teaching early computing concepts without screens; all text, card sets, and activities in this unit are original CC0 work): https://www.csunplugged.org/

Known gaps and cautions

- **Unreviewed AI draft:** This unit has not yet been reviewed by a human Grade 1 teacher or tested in a live classroom.
- **Color vision accessibility in Lesson 3:** Never rely on red vs. green color alone for two-state signal cards. Always draw a bold `✓` (checkmark) on the green side and a bold `×` (cross) or diagonal stripes on the red side so every student can distinguish the two states by shape and pattern.
- **Single-attribute vs. multi-attribute sorting:** Grade 1 Lesson 4 focuses strictly on sorting by **one attribute at a time** (`Has 4 holes` vs. `Does NOT have 4 holes`). Compound rules (`Red AND Round`) are intentionally deferred to Grades 3–6 so 6-year-old learners build confidence with clean two-bucket classification first.
- **Materials safety caution:** Use large paper shape cutouts (`at least 5 cm across`) for Lesson 4's sorting sets rather than small buttons or beads that could pose a choking or small-parts hazard, and remind students that sorting pieces stay flat on the table.

Lesson 1: First This, Then That — Step-by-Step Recipes and Order

- **Unit:** Symbols, Signals, Sorting, and Step-by-Step Recipes (Computing, Grade 1)
- **Time:** 35 minutes
- **Grouping:** Whole class on the rug, then pairs at tables

Learning objective

Students will arrange a 4-step everyday routine in exact start-to-finish order, act out the steps literally, and explain why swapping two steps causes a mistake (**bug**).

Materials

- 4 large teacher demonstration cards showing pictures and short labels for **Putting On Shoes and Socks**:
- `Put on left sock and right sock`
- `Slide feet into shoes`
- `Pull laces or straps tight`
- `Stand up and walk to the door`
- Per student pair: 4 blank index cards and crayons (or a pre-drawn 4-card picture set for students who prefer ordering/pointing rather than drawing) for a 4-step routine (such as Washing Hands, Planting a Seed, or Making a Sandwich)

Vocabulary

- **Step:** One single action in a longer task.
- **Order (Sequence):** Which step happens first, second, third, and last.
- **Algorithm:** A step-by-step list of instructions to finish a job.
- **Bug:** A mistake in the instructions (like a missing step or two steps in the wrong order) that stops the job from working right.

Lesson flow

✎ 1. Opening: The Silly Shoe Robot (7 min)

1. Tell the class: "Pretend I am a helper robot getting ready for recess. Robots only do the exact steps on their cards, in the exact order the cards are lined up!"
2. Tape the 4 teacher cards to the board in a **scrambled** order:
3. Card 1: `Slide feet into shoes`
4. Card 2: `Pull laces or straps tight`
5. Card 3: `Put on left sock and right sock`
6. Card 4: `Stand up and walk to the door`
7. Pantomime following the scrambled cards literally—pretend to tie your shoes first, and then try to pull socks over the outside of your shoes!
8. Ask: "Why did the robot put socks on the outside of its shoes? Did I have all the right steps, or was something else wrong?"

9. Guide students to notice that all 4 steps were good steps, but the **order** was mixed up.

✎ 2. Main activity: Fixing the Sequence & Making 4-Card Recipes (18 min)

1. **Whole-class repair (5 min):** Invite two volunteers to come up and rearrange the 4 shoe cards into a working **algorithm** (`Socks` → `Shoes` → `Straps` → `Walk`). Act it out again to confirm it works.
2. **Pair card creation (8 min):** Give each pair 4 blank index cards. Each pair chooses one familiar 4-step routine:
3. Option A — Washing Hands (aligned with CDC Clean Hands steps): (1) Wet hands with clean running water and turn off the tap, (2) Apply soap and scrub hands all over for at least 20 seconds, (3) Turn on the tap, rinse soap bubbles off under clean running water, and turn off the tap, (4) Dry hands with a clean towel.
4. Option B — Planting a Bean Seed: (1) Scoop soil into the cup, (2) Poke a small hole and drop the seed in, (3) Cover the seed with soil, (4) Pour a little water on top.
5. Students draw a quick picture on each card and write the numbers `1`, `2`, `3`, `4` on the **back** of the cards.
6. **The Partner Swap & Bug Hunt (5 min):**
7. Each pair turns their 4 cards number-side down, mixes up **two** of the cards on purpose, and trades with a neighboring pair.
8. The neighboring pair tests the mixed-up routine (by acting it out, describing what would happen aloud, or tracing the cards in order), points to the two swapped cards (**the bug**), and puts them back in the right order.

✓ 3. Discussion questions (5 min)

- **Question 1:** "In our hand-washing recipe, what happens if we do Step 4 (Dry hands with a towel) BEFORE Step 3 (Rinse soap bubbles off)?"
- Example good answer: All the sticky soap bubbles get wiped onto the dry towel instead of going down the sink!
- **Question 2:** "Are there ever two steps where the order does NOT matter?"
- Example good answer: Putting on your left sock first or your right sock first both work, as long as both socks go on before the shoes!

✓ 4. Closing check (5 min)

Read three quick questions aloud (for Question 1, students can hold up 1, 2, or 3 fingers for A, B, or C or point to the choice; for Questions 2 and 3, students answer aloud, point to vocabulary cards on the board, or tell a partner):

1. Here are 3 steps for brushing teeth: **(A)** Brush teeth up and down, **(B)** Squeeze toothpaste onto the brush, **(C)** Rinse mouth with water. Which step must go **first**?
2. What do computer scientists call a step-by-step recipe for finishing a job?
3. If a robot puts the hat on its feet and the shoes on its head because the instruction cards were mixed up, what do we call that mistake in the instructions?

Worked answers for closing check

1. **(B) Squeeze toothpaste onto the brush** goes first (then **A** brush, then **C** rinse).
2. An **algorithm**.
3. A **bug**.

Differentiation

- **Extra support:** Start with a 3-card routine (First / Next / Last) using pre-drawn picture cards so students can focus on ordering rather than drawing.
- **Extra challenge:** Ask pairs to add a 5th step to their routine and find two steps whose order can be swapped without breaking the result, plus two steps whose order cannot be swapped.

Teacher notes

- **Common misconception:** Young learners often skip steps they consider "obvious" (for example, drawing Eat the banana without Peel the banana). When acting out student cards as the "Classroom Robot," playfully pretend to bite an unpeeled imaginary banana so students see why machines need every step stated clearly.

Lesson 2: Pictures That Mean Something — Symbols and Shared Codes

- **Unit:** Symbols, Signals, Sorting, and Step-by-Step Recipes (Computing, Grade 1)
- **Time:** 35 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will match familiar **symbols** (icons) to their meanings, design a clear symbol for a classroom supply bin or action, and test whether a classmate can decode it without words.

Materials

- Board or chart paper showing 5 familiar symbols drawn large:
- A **heart** (♥), a **musical note** (♪), a **trash can**, a **magnifying glass**, and a **triangle play button** (▶)
- 2 blank index cards and markers per student (plus optional pre-drawn symbol stickers/stencils and a printed 6-item classroom action menu so students can also participate by selecting or pointing)

Vocabulary

- **Symbol (Icon):** A simple picture or mark that stands for a word, object, or action.
- **Decode:** To look at a symbol or secret code and figure out what message it means.
- **Shared Rule (Key):** The agreement between the sender and the reader about what each symbol means.

Lesson flow

✎ 1. Opening: Reading Without Letters (7 min)

1. Point to the 5 symbols on the board (♥, ♪, trash can, magnifying glass, ▶).
2. Ask: "There are zero letters written inside these five drawings, yet you already know what they mean! Turn to your partner and tell them what the triangle ▶ and the magnifying glass tell you to do on a screen or player."
3. Expected answers: ▶ means **Play / Start**, and the magnifying glass means **Search / Look closely**.
4. Connect to Grade 1 Language and Literacy (Blending and Decoding): just as the letter symbol `m` stands for the `/m/` sound because readers agree on that rule, picture **symbols** let people and computers share instructions quickly in a tiny space.

✎ 2. Main activity: Classroom Symbol Designers & Silent Decoding (18 min)

1. **What makes a good symbol? (5 min):**

2. Draw two versions of a symbol for the **"Scissors Bin"** on the board:
    - Drawing A: A giant detailed picture of a whole classroom with tables, windows, a clock, and tiny scissors in the corner (takes 2 minutes to draw, hard to tell what matters).
    - Drawing B: Two crossed blades and two finger loops (simple, bold, takes 5 seconds to draw and recognize from across the room).
3. Emphasize: A strong symbol is **simple**, **clear**, and shows only the most important shape.
4. **Design 2 Action Symbols (8 min):**
5. Give each student 2 index cards. On the **back** of each card, the teacher (or student) whispers/marks one secret classroom action from a 6-item picture menu on the board:
    1. Wash hands (water drop + hand)
    2. Quiet voices (finger over lips or crossed-out speaker)
    3. Line up at the door (three stick figures in a row by a rectangle door)
    4. Sharpen pencil (pencil tip with shavings)
    5. Put book in backpack (rectangle book + arrow into bag)
    6. Sit in a circle (circle of dots or arrows)
6. On the **front** of each card, students draw a simple symbol using **no letters or numbers**.
7. **Silent Partner Decode Test (5 min):**
8. Partners trade cards front-side up. The partner **decodes** the symbol by pointing to the matching action on the 6-item picture menu, stating it quietly, or acting it out. If the partner identifies the right job, the symbol passed the test!

✓ 3. Discussion questions (5 min)

- **Question 1:** "What would happen if I decided that a green circle on our classroom door meant 'Come inside,' but the principal thought a green circle meant 'Stay out'?"
- Example good answer: People would get confused and do the wrong thing because they didn't share the same rule (key) for the symbol.
- **Question 2:** "Why do computer buttons and road signs often use simple pictures instead of long sentences?"
- Example good answer: You can understand a simple picture in one glance, even from far away or if you are still learning to read long words.

✓ 4. Closing check (5 min)

Students answer three quick checks:

1. A button on an audio player shows **two vertical bars (⏸)** next to the triangle play button (▶). What action does that symbol stand for?
2. You want to put a symbol on the classroom **Recycling Bin for Paper**. Which is a clearer symbol: a drawing of a whole school building, or a drawing of a sheet of paper with arrows going in a circle? Why?
3. What does it mean to **decode** a symbol?

Worked answers for closing check

1. **Pause / Stop for a moment.**
2. **A sheet of paper with arrows in a circle**, because it is simple and shows the exact item and action without extra confusing details.
3. To look at the symbol and translate it back into the word, idea, or action it stands for.

Differentiation

- **Extra support:** Provide stencil shapes (circles, triangles, arrows) so students can combine simple shapes into symbols without worrying about freehand drawing.
- **Extra challenge:** Ask pairs to combine **two** symbols in sequence on one strip (for example, `[Pencil Symbol] → [Backpack Symbol]`) to write a 2-step symbol sentence ("Put your pencil in your backpack").

Teacher notes

- **Common misconception:** Students sometimes treat drawing a symbol as an art contest and add rainbows, grass, and smiling suns around the icon. Remind them that extra decorations can confuse the reader ("Wait—does this bin hold pencils, or does it hold sunglasses?").

Lesson 3: Red Card, Green Card — Two-State Signals for Yes and No

- **Unit:** Symbols, Signals, Sorting, and Step-by-Step Recipes (Computing, Grade 1)
- **Time:** 35 minutes
- **Grouping:** Whole class and pairs across tables

Learning objective

Students will send and receive **two-state signals** (`YES` / `NO`) without speech across the classroom to answer questions and play a mystery guessing game, and explain how two distinct states (visual, tactile, or sound) can carry information without spoken words.

Materials

- Per student: one two-sided **Signal Card** (with an optional raised tactile sticker/felt dot on the `YES` side, or paired with a sound/touch signal such as `1 tap = YES` / `2 taps = NO` for non-visual access):
- Side 1: **Green with a bold black `✓` (checkmark)** — means `YES / TRUE`
- Side 2: **Red with bold black stripes and an `×`** — means `NO / FALSE`
- 4 large **Mystery Object picture cards** for the board (`1. Red Apple`, `2. Yellow School Bus`, `3. Green Frog`, `4. Red Fire Truck`)
- Optional teacher prop: a classroom flashlight or desk lamp (`ON` = Yes, `OFF` = No)

Vocabulary

- **Signal:** A sound, light, or movement that sends a message from one place to another.
- **Two-State Signal:** A signal that only has two clear choices—such as `ON` or `OFF`, `GREEN ✓` or `RED ×`, or `1 clap` vs. `2 claps`.
- **Sender and Receiver:** The **sender** makes the signal; the **receiver** watches or listens to read the message.

Lesson flow

✎ 1. Opening: Talking Across a Noisy River (7 min)

1. Ask students to imagine standing on opposite sides of a rushing waterfall where nobody can hear a spoken voice.
2. Ask: "If your friend across the waterfall holds up an apple and wants to ask 'Are you hungry?', how could you answer **YES** or **NO** without shouting a single word?"
3. Collect student ideas: nodding vs. shaking head, thumbs up vs. thumbs down, holding up a green `✓` card vs. a red `×` card, or flashing a flashlight `ON` vs. keeping it `OFF`.
4. Explain: Computers inside wires cannot shout words either! Instead, they send tiny electrical or light **signals** that have just **two states** (`ON` and `OFF`), which prepares students for how computers use binary in later grades.

✎ 2. Main activity: Silent Signal Relay & Mystery Animal Game (18 min)

1. **Whole-class Signal Check (5 min):**
2. Hand out the two-sided **Green** ✓ **/ Red** × **Signal Cards**.
3. Practice signaling without speech: when the teacher asks a question, nobody speaks—every student holds up the card side (or uses the agreed tap signal) that matches the truth:
    - "Does a triangle have 3 corners?" → Class holds up **Green** ✓.
    - "Do fish live in trees?" → Class holds up **Red** ×.
    - "Are we in Grade 1?" → Class holds up **Green** ✓.
4. **Changing the Physical Signal (4 min):**
5. Put the cards flat on the floor. Now send the **exact same information** using a sound signal:
    - **1 clap** = `YES`
    - **2 claps** = `NO`
6. Ask two more questions (`"Is 2 + 2 equal to 4?"` → 1 clap; `"Is ice hot?"` → 2 claps). Point out that the **message** (`YES` or `NO`) stayed the same even when the **signal tool** changed from colors to claps!
7. **Partner 4-Question Mystery Object Game (9 min):**
8. Place 4 picture cards on the board where everyone can see them:
    1. **Red Apple** (Round, Red, Fruit, No legs)
    2. **Yellow School Bus** (Rectangle, Yellow, Has wheels, No legs)
    3. **Green Frog** (Green, Living animal, Has legs, No wheels)
    4. **Red Fire Truck** (Rectangle, Red, Has wheels, No legs)
9. In pairs sitting across a table:
    - **Sender** secretly picks one of the 4 pictures and writes its number (`1`, `2`, `3`, or `4`) face-down.
    - **Receiver** asks up to **4 yes/no questions** (`"Is your mystery item red?"`, `"Does it have wheels?"`), and the **Sender** answers using their agreed two-state signal (holding up the **Green** ✓ **/ Red** × **Signal Card**, using a tactile card side, or tapping `1 tap = YES` / `2 taps = NO`).
    - Then partners switch roles.

✓ 3. Discussion questions (5 min)

- **Question 1:** "Why did we put a black checkmark ✓ and black stripes ▨ on our cards in addition to green and red?"
- Example good answer: Because color alone can be hard to tell apart in dim light, from far away, or for people with color-blind vision; adding distinct shapes (✓ vs. ×), tactile stickers, or sound signals (`1 clap` vs. `2 claps`) makes the signal much clearer and more accessible.
- **Question 2:** "What happens if a sender holds their card sideways so the receiver can't see either side?"
- Example good answer: The message is unclear! A two-state signal only works when you clearly choose one of the two states.

✓ 4. Closing check (5 min)

1. You and your partner agree on this rule for a flashlight: **Light ON = Yes**, **Light OFF = No**. On a Tuesday morning at school, your partner asks, "Is today a school day?" What should you do with the flashlight?
2. Can a two-state (`YES / NO`) card directly answer the question "What is your favorite color?" Why or why not? How could you change the question so the card can answer it?
3. Name two different ways to send a two-state (`YES / NO`) signal without speaking.

Worked answers for closing check

1. **Turn the flashlight ON** (since Tuesday at school is a school day, and `ON` stands for `YES`; if asked on a weekend day with no school, you would leave the flashlight **OFF** for `NO`).
2. **No**, because "What is your favorite color?" has many possible answers, not just yes or no. You can change it into a yes/no question like "Is your favorite color blue?"
3. Any two clear pairs: **Green ✓ / Red × cards**, **thumbs up / thumbs down**, **nodding / shaking head**, **1 clap / 2 claps**, or **flashlight ON / OFF**.

Differentiation

- **Extra support:** Practice the 4-picture Mystery Game together as a whole group first, crossing off eliminated pictures on the board after each `Green ✓` or `Red ×` answer.
- **Extra challenge:** Expand the board to **8 mystery pictures** and challenge pairs to find which 3 yes/no questions can identify any of the 8 pictures every single time.

⚠ Safety

- If using a teacher flashlight, shine it toward the wall or ceiling card rather than toward students' eyes.

Teacher notes

- **Connection to later grades:** This lesson builds the physical intuition for **binary states (`1` and `0`)** and **decision trees** without needing any math notation beyond counting to 2.

Lesson 4: One Rule at a Time — Sorting Objects by Attributes

- **Unit:** Symbols, Signals, Sorting, and Step-by-Step Recipes (Computing, Grade 1)
- **Time:** 35 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will **sort** a mixed collection of 8 to 10 items into two groups using a single clear **attribute** rule (`YES, matches the rule` vs. `NO, does not match`), and determine a partner's secret sorting rule by inspecting the sorted groups.

Materials

- Per student pair:
- A sorting mat made from a folded sheet of paper labeled **Side A: YES (Matches the Rule)** and **Side B: NO (Does Not Match)**
- An envelope of **10 large pre-made paper cutouts (`at least 5 cm wide`)** with a fixed starter composition (**6 cutouts with `4 dots` and 4 cutouts with `2 dots`**, including **3 Squares, 4 Circles, and 3 Leaves**) plus **2 extra test cutouts** (`1 Blue Circle with 4 dots` and `1 Yellow Square with 2 dots`, set aside for Round 2):
  - **3 Squares:** `2 Blue Squares with 4 dots` and `1 Yellow Square with 2 dots`
  - **4 Circles:** `2 Blue Circles with 4 dots` and `2 Yellow Circles with 2 dots`
  - **3 Leaves** (connecting to Grade 1 Science: Plants—smooth-edge vs. jagged/toothed-edge leaves): `2 Yellow Smooth-Edge Leaves with 4 dots` and `1 Blue Jagged-Edge Leaf with 2 dots`

Vocabulary

- **Attribute (Property):** Something you can observe or count about an object, such as its color, shape, size, or number of dots.
- **Sorting Rule:** A clear question that puts every object into a `YES` group or a `NO` group (for example, "Does it have 4 dots?").
- **Data:** A collection of facts or items that we can count, compare, and sort.

Lesson flow

✎ 1. Opening: The Messy Supply Box vs. The Sorted Box (7 min)

1. Hold up a cup of 10 mixed paper shapes/buttons and dump them in a pile. Ask quickly: "You have 2 seconds—are there more 4-dot pieces or 2-dot pieces?" (It is hard to tell when everything is jumbled together!)
2. Now slide all the **4-dot** pieces onto the `YES` side of the mat and all the **2-dot** pieces onto the `NO` side, lining them up in two neat rows (`6` on the left, `4` on the right).
3. Ask the same question again: "Now how fast can you tell which group has more?"

4. Explain: Computers sort **data** using clear **attributes** so they can count and find things almost instantly.

✎ 2. Main activity: Rule Makers & Rule Detectives (18 min)

1. **One Rule, Two Groups (5 min):**
2. Show why a sorting rule must be **observable and exact**:
    - Good rule: **"Is the shape a circle?"** (Every classmate will put the exact same pieces into `YES` and `NO`.)
    - Vague rule: **"Is this piece cool?"** (Different people disagree, and a computer wouldn't know which pile to pick!)
3. **Round 1 — Follow the Teacher's Rule (5 min):**
4. Call out an attribute rule: **"Rule 1: Does it have 4 dots?"**
5. Pairs sort all 10 pieces onto their `YES` and `NO` mat, then count how many pieces landed in each group (`6` in `YES`, `4` in `NO`).
6. Repeat with a second rule using the **exact same 10 pieces**: **"Rule 2: Is the shape a square?"** Now `3` cutouts land in `YES` (the 3 Squares) and `7` cutouts land in `NO` (the 4 Circles and 3 Leaves)—notice how the very same pieces move into different groups when the rule changes!
7. **Round 2 — Secret Rule Detective (8 min):**
8. **Partner A (Rule Maker)** secretly chooses one attribute (such as Color = Blue, Shape = Leaf with jagged edges, or Dots = 2) and sorts all 10 pieces onto the `YES` and `NO` mat without speaking.
9. **Partner B (Rule Detective)** inspects both groups, tests their idea by taking 1 of the **extra test cutouts** and placing it on the matching side of the mat, and states a candidate rule aloud. (Note that one test piece checks whether a rule fits so far, and sometimes two different rules—such as 'Has 4 dots' vs. 'Not 2 dots'—can fit the same piles; accept any rule that accurately matches all sorted cutouts, or test the second extra cutout and have Partner A reveal their intended rule.)
10. Switch roles and play again.

✓ 3. Discussion questions (5 min)

- **Question 1:** "Why did a blue square with 4 dots go into the *`YES`* pile during Round 1 ('Does it have 4 dots?'), even though it was blue and square?"
- Example good answer: Because our rule only checked the number of dots, so the computer ignored color and shape during that sort.
- **Question 2:** "In Grade 1 Science (Plants), how could a botanist use a *`YES / NO`* sorting rule to organize a basket of leaves?"
- Example good answer: They could check one clear attribute, like "Does the leaf have a smooth edge (YES) or a jagged edge (NO)?"

✓ 4. Closing check (5 min)

Draw 5 items on the board: - **Item A:** Big Black Circle with 2 dots - **Item B:** Small White Square with 4 dots - **Item C:** Big White Circle with 4 dots - **Item D:** Small Black Triangle with 2 dots - **Item E:** Big Black Square with 4 dots

Ask students: 1. If the sorting rule is **"Does it have 4 dots?"**, which items go into the **YES** group? 2. If we sort the exact same 5 items using a new rule, and the **YES** group ends up with **Item A** and **Item C**, what was the secret sorting rule? 3. Why is "Is it a nice shape?" a bad sorting rule for a computer?

Worked answers for closing check

1. **Items B, C, and E** (all three have 4 dots).
2. **"Is it a Circle?"** (Items A and C are the only circles).
3. Because "nice" is an opinion, not a measurable **attribute**, so a computer has no exact rule to test.

Differentiation

- **Extra support:** Give students attribute cards showing icons (`Color`, `Shape`, `Number of Dots`) so they can point to the card they are testing.
- **Extra challenge:** After sorting into `YES` and `NO` by **Shape (Circle vs. Not Circle)**, ask pairs to sort each side again by **Number of Dots (4 dots vs. 2 dots)** to create a 2×2 four-box grid.

⚠ Safety

- Use large paper shape cutouts (`at least 5 cm wide`) rather than small buttons or beads, and keep all cutouts flat on the sorting mat.

Teacher notes

- **Common misconception:** When playing Secret Rule Detective, students sometimes state two different rules for the two sides (for example, "This side is circles, and that side is 2-dot pieces"). Remind them that the `NO` side must simply be **"Everything that is NOT [the YES rule]"** so no piece is ever left homeless or placed in both piles at once.

Lesson 5: Tools That Hold or Send Messages — Information Around Us

- **Unit:** Symbols, Signals, Sorting, and Step-by-Step Recipes (Computing, Grade 1)
- **Time:** 35 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will distinguish **information tools** (everyday objects and computers that store, display, or send words, numbers, pictures, or sounds) from tools that only do physical work, and complete the end-of-unit synthesis check.

Materials

- 1 large teacher demonstration set of 8 object picture cards for the board, plus **1 printed set of the same 8 picture cards per student pair** for the Step 2.2 pair sort:
- **Storybook** (stores words and pictures)
- **Wall clock** (shows time information with numbers/hands)
- **Wooden spoon** (stirs soup; does not store or send messages)
- **Telephone / tablet** (sends and receives voice, pictures, and text messages)
- **Traffic light** (sends stop/go signals with lights)
- **Umbrella** (blocks rain; does not store or send messages)
- **Thermometer** (shows temperature information)
- **Pair of scissors** (cuts paper; does not store or send messages)
- 1 end-of-unit half-sheet check per student

Vocabulary

- **Information:** Words, numbers, pictures, or sounds that tell us something we want to know.
- **Information Tool:** A tool or machine made to **store** (save for later), **show**, or **send** information.
- **Computer:** A machine that takes in information, follows a step-by-step algorithm, and stores or shows new information.

Lesson flow

✎ 1. Opening: The Book vs. The Brick (7 min)

1. Hold up a **hardcover picture book** in one hand and a **wooden block (or stapler)** in the other hand.
2. Ask: "Both of these are about the same size and sit on a shelf. Which one can tell you a story or teach you how a frog grows?" (The book!)
3. Explain: The wooden block holds up a tower, which is a physical job. The book is an **information tool**—its job is to store **words and pictures** so someone can read them

tomorrow or next year. Computers, clocks, thermometers, and phones are also information tools!

✎ 2. Main activity: Information Tool Detective Walk & 8-Card Sort (18 min)

1. **Three Jobs of Information Tools (5 min):** Write three action words on the board with simple icons:
2. **STORE (Save):** Like a book, a calendar, or a camera photo album.
3. **SHOW / MEASURE:** Like a wall clock, a ruler, or a thermometer.
4. **SEND (Share across a distance):** Like a telephone, a walkie-talkie, or a traffic light.
5. **8-Card Pair Sort (8 min):**
6. Using the sorting skill from Lesson 4, pairs sort the 8 object cards using the rule: **"Is its main job to store, show, or send INFORMATION?"**
7. Review each card together:
    - **YES (Information Tools):** Storybook, Wall clock, Telephone/tablet, Traffic light, Thermometer.
    - **NO (Physical-only Tools):** Wooden spoon, Umbrella, Scissors.
8. **Classroom Detective Spot-Check (5 min):**
9. Invite students to point from their seats to one **information tool** in the classroom (for example, the daily schedule chart, the fire-exit sign, the teacher's laptop, or the calendar) and tell a partner what kind of information it stores or shows.

✓ 3. Discussion questions (5 min)

- **Question 1:** "Is a paper notebook an information tool even though it has no screen, no wires, and no batteries?"
- Example good answer: Yes! Once you write words, numbers, or symbols in it, the notebook **stores** that information so you don't forget it.
- **Question 2:** "How does a computer combine ALL the ideas from our five lessons?"
- Example good answer: A computer follows step-by-step **algorithms** (Lesson 1), displays **symbols** on its screen (Lesson 2), uses **two-state on/off signals** inside its wires (Lesson 3), **sorts** data by rules (Lesson 4), and stores or sends **information** (Lesson 5)!

✓ 4. End-of-unit synthesis & Closing check (5 min)

Students answer four unit review questions (orally or by circling answers on their half-sheet):

1. **(Lesson 1 — Order):** Put these 3 steps for mailing a birthday card in the right order:
2. **(A)** Drop the sealed envelope into the mailbox
3. **(B)** Write your friend's name on the card
4. **(C)** Put the card inside the envelope and seal it
5. **(Lesson 2 & 3 — Symbols & Signals):** On a classroom model of a pedestrian signal, the display shows a **white walking-person symbol** vs. a **red raised-hand symbol**. Which symbol indicates the **WALK signal phase (`YES, walk phase`)**, and why must a real pedestrian still stop at the curb, look both ways for traffic, and cross with a trusted adult?

6. **(Lesson 4 — Sorting):** Look at these four animals: **Duck (2 legs)**, **Dog (4 legs)**, **Cat (4 legs)**, **Robin (2 legs)**. What single sorting rule puts **Dog** and **Cat** into the `YES` group and **Duck** and **Robin** into the `NO` group?
7. **(Lesson 5 — Information Tools):** Circle the **two** items below whose main job is handling **information**:
8. `Hammer` | `Thermometer` | `Winter Coat` | `Library Book`

Worked answers for closing check

1. **Order: (B)** Write on the card → **(C)** Put it in the envelope and seal it → **(A)** Drop it into the mailbox.
2. The **white walking-person symbol** indicates the **WALK signal phase (`YES, walk phase`)** (while the red raised hand indicates **WAIT / DO NOT START CROSSING**). **Safety rule:** A signal only shows the light's phase—it cannot guarantee that the road is clear or stop a moving vehicle, so pedestrians must always stop, look and listen for traffic in all directions, and follow local crossing rules with an adult.
3. **"Does the animal have 4 legs?"** (or "Does it have fur instead of feathers?").
4. **`Thermometer`** (measures and shows temperature information) and **`Library Book`** (stores words and pictures).

Differentiation

- **Extra support:** Allow students to act out what they do with each object (stirring with a spoon vs. reading a book or checking the time on a clock) to feel the difference between moving physical matter and getting a message.
- **Extra challenge:** Ask students to find a **"hybrid" machine** at home or school that does BOTH a physical job AND handles information (for example, a washing machine that spins wet clothes physically and has a digital timer screen that counts down minutes and beeps).

Teacher notes

- **Common misconception:** Many 6-year-olds assume that "information" only lives inside glowing electronic screens. Highlighting non-electronic information tools (books, calendars, road signs, tally marks, and the two-color signal cards from Lesson 3) helps students see computing as part of a long human history of recording and sending messages.

Grade 1 Computing: Programming a Floor Robot: Plan, Test, Fix and Repeat (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 9 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Every route in the answer keys was checked with a small computer simulation of the grid, but not with children. Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 1 year plan - Term 2

It follows the kindergarten computing units (Clear Instructions for Everyday Tasks, Gemini 4 Argon's Step-by-Step Robot Recipes and Floor-Grid Paths and Patterns and Fixing a Wrong Step) and Argon's grade 1 term 1 unit, Symbols, Signals, Sorting, and Step-by-Step Recipes.

This unit is "unplugged": a child (or a toy moved by a child) is the robot. If the school has a programmable floor robot, lesson 5 can use it, but no device is needed.

Big idea

A program is a list of steps written **before** the robot moves. We plan the whole route, test it one step at a time, find the first step that goes wrong, fix just that step and test again. When a step repeats, we can write it once with a **repeat** card.

Outcomes

By the end of the unit, most children can:

1. Write a whole program with arrow cards (forward, turn left, turn right) before the robot moves, for a route of up to five cards on a 4 by 4 grid.
2. Choose the right turn by looking from the robot's point of view, even when the robot faces them.
3. As tester, run a program one card at a time, point to the first card that goes wrong, and fix it.
4. Show that there can be more than one right program for the same route, for example round two "rocks".
5. Spot three forward cards in a row and swap them for a **repeat 3** card followed by one forward card (repeat 3, forward).

Prior knowledge

- Kindergarten: giving clear instructions, the forward and turn arrow cards on a 3 by 3 grid, and the tester's job of finding one wrong card.
- Counting to 10. Telling left from right is **not** needed: the turn cards and the "stand behind the robot" trick (lesson 2) do that job.
- Children do not need to read; every card is a picture.

Lessons

Lesson	Title	Time	Core idea
1	Write it all first	30 min	Programmer, tester and bot roles; the whole program is written before the bot moves
2	Which way is the robot facing?	30 min	Turn cards from the robot's point of view; routes with one turn
3	Find the first wrong card	30 min	Testing step by step; missing, extra and wrong-turn bugs
4	Round the rocks	30 min	Rocks on the grid; two different right programs
5	Spot the repeat	30 min	Repeat cards; robot show; one-to-one check

Timings: lessons 1-4 are 30 minutes (5 + 17 + 4 + 4); lesson 5 is 30 minutes (3 + 15 + 7 + 5, with the check spread over the week).

The grid and the cards

- **Floor grid:** 4 by 4 squares, made with masking tape on the floor, or chalk outside. Squares big enough for a child to stand in with both feet (about 40 cm across works for most children; make them bigger for a child using a wheelchair or walker, or use a table grid for that child's group).
- **Front edge:** mark one edge of the grid with a strip of coloured tape and a picture card (for example a sun). The teacher and the programmer's table stay at the front edge.
- **Naming squares (for the teacher only):** in the answer keys, "column 1" is on the left when you stand at the front edge looking at the grid, and "row 1" is the row nearest the front edge. So (column 1, row 1) is the front-left square. Children do not use these names; put a start card and a star card on the squares instead.
- **Arrow cards: forward** (a straight arrow, one square), **turn left** and **turn right** (a curved arrow, a quarter turn on the spot, with no step). These are the same three moves as in the kindergarten robot unit. Write "forward", "turn left" and "turn right" small on each card for adults.
- **Program strip:** a long paper strip with ten boxes, so a program can be laid out in order, left to right.
- **Table grids:** a 4 by 4 grid on paper (squares about 5 cm) with a toy or counter as the robot, for pairs or groups who are not on the floor grid, and for any child who prefers it.

Materials

- The 4 by 4 floor grid with the marked front edge (above). If only one floor grid is possible, other groups use table grids.
- **Start card** and **star card** (the goal), one of each per grid.
- **Arrow card sets:** one per group of three (or per pair at a table grid): 8 forward, 3 turn left, 3 turn right.
- **Program strips:** one per group.
- **Job badges:** programmer, tester and bot (one set per group of three; on a string or a clip).
- **Table grids:** one per pair, each with a small toy or counter that has a clear front (draw a face or an arrow on it).

- **Bug programs** (lesson 3): three program strips already filled in with a mistake each (see lesson 3), plus one for the closing check.
- **Two "rocks"** per grid (lesson 4): cushions, beanbags or small boxes that fit inside a square.
- **Repeat cards** (lesson 5): one each of **repeat 2**, **repeat 3** and **repeat 4** per group (a loop arrow with a big number).
- A piece of string or wool per group (lesson 5 stretch only), to loop round a group of cards.
- Optional (lesson 2 support): a sticker for a child's right hand, only if the school already uses this.
- **Check things** (lesson 5): a table grid with a toy robot, start and star cards, arrow cards, a repeat 3 card, two filled-in program strips (see lesson 5) and the record sheet (class list with five columns).
- Optional: a programmable floor robot (lesson 5), with a grid sized to match how far it moves for one press.
- Optional, for blind or low-vision children: tactile arrow cards (arrows made from pipe cleaners or raised glue lines) and a grid with raised edges (in every lesson); raised blocks for the rocks (lessons 4 and 5); tactile repeat cards for 2, 3 and 4 (a raised loop and 2, 3 or 4 raised dots; lesson 5).
- Ear defenders and a quiet spot, as in every unit.

Access and inclusion

- **Every role is real.** A child who prefers not to walk the grid can be programmer or tester, or move a toy robot on a table grid. Being the bot is never required.
- **Wheelchair users and walker users:** bigger squares, or the child moves a toy robot on a table grid, or directs a partner. A quarter turn in a wheelchair counts as a turn.
- **Speaking is optional.** Programs are cards, so a child can program by laying out cards and test by pointing; the bot can show "done" with a thumbs-up or a tick card.
- **Blind or low-vision children:** tactile arrow cards, a raised-edge table grid, and a partner who says each card aloud. On the floor grid a partner can walk beside the bot and tap each square.
- **Deaf or hard-of-hearing children:** the tester points to each card and shows it to the bot before the bot moves, so nobody needs to hear the instruction.
- **Left and right:** never test children on left and right words. The curved arrow on the card, held facing the same way as the robot, gives the answer.
- **Movement and noise:** the bot walks slowly, one square per card. Quiet spot and ear defenders are always allowed.

Assessment

Lesson 5 includes a five-part check, done one-to-one with a table grid (about 4 minutes each child; spread over the week). Record each part as **yes**, **with help** or **not yet**:

1. **Predict:** the robot starts on (column 2, row 1) facing away from the child, and the program is forward, forward, turn right, forward. The child puts a finger on the square where it stops. (Answer: column 3, row 3.)
2. **Write:** robot on (column 1, row 1) facing away from the child, star on (column 3, row 3). The child lays out a program with arrow cards. (Any program that reaches the star counts; for example forward, forward, turn right, forward, forward.)
3. **Turn from the robot's view:** the robot is turned to face the child. The child picks the turn card that would make it turn towards the star card (placed beside the grid, to one side of the toy), by standing behind it, turning the card or pointing. (Check by turning the toy.)

4. **Find the bug:** the program forward, turn left, forward, forward, forward should take the robot from (column 1, row 1), facing away from the child, to the star on (column 4, row 2). The child runs it one card at a time and points to the first card that goes wrong, then fixes it. (Answer: the turn left card; after it, the next forward walks off the grid. Swapping it for turn right makes the program work.)
5. **Repeat:** given forward, forward, forward, the child swaps them for the repeat 3 card followed by one forward card (repeat 3, forward). Either order counts as **yes** if the child says or shows that the forward happens three times.

Doing it in their own way (pointing, moving the toy, the child's usual access) counts as **yes**. "Not yet" is normal for some children; programming returns in grade 2.

Sources

- CS Unplugged, "Kidbots" topic page and "What's it all about?": https://www.csunplugged.org/en/topics/kidbots/ (read 9 November 2026). Writing a program involves planning, coding the instructions, testing, tracking down bugs and changing the program; Kidbots separates the roles of programmer, tester and bot, so the programmer does not adjust the program on the fly; there can be more than one correct way to program a solution.
- CS Unplugged, "Rescue Mission" (ages 5 to 7, lesson 1): https://www.csunplugged.org/en/topics/kidbots/rescue-mission/ (read 9 November 2026). A large floor grid (tape, carpet or chalk), arrow cards for move forward, turn left and turn right, job badges, and left and right cards for children still learning left and right; "ALL the instructions are written before the Bot can follow those instructions". Lessons 1 to 3 follow this structure.
- Wikipedia, "Logo (programming language)": https://en.wikipedia.org/wiki/Logo_(programming_language) (read 9 November 2026). Papert's "body-syntonic reasoning": children predict and reason about the turtle's motion by imagining what they would do if they were the turtle. Lesson 2's "stand behind the robot" trick uses this idea.
- Wikipedia, "Turtle (robot)": https://en.wikipedia.org/wiki/Turtle_(robot) (read 9 November 2026). Turtles are small educational robots closely linked with Seymour Papert and Logo in computer education.
- No computing standard or national curriculum document was read for this unit.

Known gaps

- **No standard read.** The outcomes are the author's judgement.
- **The repeat card is a stretch for some six-year-olds.** Lesson 5 keeps it to one card repeated; repeating a group of cards is an extension only.
- **Real floor robots differ.** Some move further than one grid square per press, and some only turn on the spot. Check your robot before lesson 5 and size the grid to match.
- **Grid size:** a 4 by 4 floor grid takes about 1.6 m by 1.6 m. Classrooms without the space can use table grids throughout.
- Peer check: Gemini 4 Argon did a bounded text, link, timing, year-plan count and route-simulation check at cb14446 on 9 November 2026 (not an educator or classroom review): links, timings and all grid routes passed; its three notes (repeat-card order to match lesson 5; tactile repeat cards and raised rocks for blind or low-vision children; a named target for check item 3) were folded in at 59f137c, which Argon also diff-checked the same day (see PEERCHECKS.md).

The lesson order matters: children write whole programs (lesson 1) before turns (lesson 2), test and fix (lesson 3) before routes with more than one answer (lesson 4), and use repeat cards (lesson 5) only once programs with plain cards are secure.

Lesson 1: Write it all first

Unit overview - Next: Lesson 2: Which way is the robot facing?

Goal: Children take the roles of programmer, tester and bot, and write a whole program with forward cards **before** the bot moves.

Length: about 30 minutes.

Materials

- The 4 by 4 floor grid with the marked front edge (see the unit overview).
- Start card and star card.
- One arrow card set per group of three (only the forward cards are used today) and one program strip per group.
- Job badges: programmer, tester, bot (one set per group).
- Table grids with a toy robot, for groups not on the floor grid and for any child who prefers it.
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile arrow cards and a raised-edge table grid.

Steps

✎ Opening (5 min)

Children sit along the front edge. Remind them of the kindergarten robot game: "Last year the robot moved one card at a time while you watched. Today we are real programmers: we write **all** the cards first, and only then does the robot move."

Show the three jobs with the badges:

- **Programmer:** lays out the arrow cards on the program strip.
- **Tester:** points to one card at a time and shows it to the bot, and watches for anything that goes wrong.
- **Bot:** does exactly what each card says, one square at a time, and nothing else.

✎ Main activity (17 min)

1. **Teacher models (5 min).** Put the start card on (column 1, row 1) and the star on (column 1, row 4). A volunteer bot stands on the start, facing the back of the grid (away from the front edge). Ask: "How many forward cards?" Children count the squares with their fingers in the air. The teacher lays out the cards on the strip, then the tester points to each card and the bot steps. (Answer: three forward cards; the bot ends on the star.)
2. **Rule check:** "Can the programmer add a card once the bot has started?" (No. If it goes wrong, we stop, go back to the start and change the program. That is lesson 3.)

3. **Groups of three (12 min).** Each group takes a turn on the floor grid or works at a table grid. Try:
    - start (column 2, row 1), star (column 2, row 3), bot facing the back: two forward cards;
    - start (column 4, row 1), star (column 4, row 4), bot facing the back: three forward cards. Then the programmer puts the star on any square straight ahead of the bot in the same column and writes the program. Swap badges after each route so everyone tries each job they want.

✓ Discussion questions (with answers) (4 min)

- "Why do we write all the cards before the bot moves?" (So the program is finished and can be tested; the bot follows the program, not someone's shouts.)
- "What does the tester do?" (Shows one card at a time and watches for anything going wrong.)
- "The bot stepped two squares for one card. Is that the bot's mistake or the program's?" (The bot's: one forward card is one square. The program was right.)

✓ Closing check (with answers) (4 min)

Put the start card on (column 3, row 1) with a toy robot facing the back. Lay out two forward cards. Children point to where it will stop, then a tester runs it.

Answer: (column 3, row 3), the square two ahead of the start.

Vocabulary

program, programmer, tester, bot, forward, start, star (goal).

Differentiation

- **Support:** the child counts the squares by touching them on a table grid, then lays down one forward card per square touched.
- **Stretch:** the programmer writes a program for a star the tester chooses, without counting aloud first.

⚠ Safety

- The bot walks, never runs, and only inside the grid.
- Keep the grid clear of bags and chairs; tape down any curling edges.

Teacher notes

- Kidbots (CS Unplugged) separates the jobs on purpose so the programmer cannot fix the program "on the fly". Keep to this today, even when it is tempting to call out.

- Turns come in lesson 2. If a child wants a turn today, say "Great idea: that's next lesson."

Lesson 2: Which way is the robot facing?

Unit overview - Previous: Lesson 1: Write it all first - Next: Lesson 3: Find the first wrong card

Goal: Children use the turn left and turn right cards from the robot's point of view, and write programs with one turn.

Length: about 30 minutes.

Materials

- The 4 by 4 floor grid with the marked front edge.
- Start card and star card.
- One arrow card set per group of three (forward, turn left, turn right) and one program strip per group.
- Job badges: programmer, tester, bot.
- Table grids with a toy robot (with a clear front).
- Optional (support): a sticker for a child's right hand, only if the school already uses this.
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile arrow cards and a raised-edge table grid.

Steps

✎ Opening (5 min)

A volunteer bot stands in the middle of the grid facing the back. Show a turn card: "A turn card means turn on the spot, a quarter turn, no step." The bot turns; children copy, standing in their places.

Now the bot turns round to face the class. Hold up the turn right card and ask: "Which way will the bot turn?" Let children guess, then show the trick.

Stand behind the robot: the tester stands behind the bot, facing the same way, and holds the turn card up in front of their own chest. The curved arrow now points the way the bot turns. With a toy robot, children walk round the table (or turn the table grid) until they are behind the toy.

✎ Main activity (17 min)

Groups of three with badges, on the floor grid or a table grid. The programmer writes the whole program first, as in lesson 1. Use these routes (bot starts on the start card):

1. Start (column 1, row 1), facing the back; star (column 3, row 3). Answer: forward, forward, turn right, forward, forward.
2. Start (column 1, row 1), facing the back; star (column 4, row 2). Answer: forward, turn right, forward, forward, forward.
3. **The tricky one.** Start (column 4, row 4) in the back-right corner, facing the **front edge** (towards the class); star (column 2, row 4). Answer: turn right, forward, forward. From the bot's view, the star is on its right even though it is on the class's left. Ask:

"What happens with turn left?" (The bot would face the side edge and walk off the grid on the first forward card: stop it there.)

Swap badges after each route. Early finishers place their own star one turn away and write the program.

✓ Discussion questions (with answers) (4 min)

- "Why did route 3 feel back to front?" (The bot was facing us, so its right is on our left.)
- "How can you always pick the right turn card?" (Stand behind the robot, or turn yourself or the grid so you face the same way.)
- "Does a turn card move the bot to a new square?" (No, it only turns on the spot.)

✓ Closing check (with answers) (4 min)

Toy robot on (column 2, row 1), facing the back. Program: forward, turn right, forward. Children point to where it ends and which way it faces.

Answer: (column 3, row 2), facing the right-hand side edge (as seen from the front).

Vocabulary

turn left, turn right, quarter turn, facing, point of view.

Differentiation

- **Support:** the child holds the turn card against the toy's back so the arrow shows the way; or uses a sticker on the bot's right hand if the school does this (never tested).
- **Stretch:** a route with two turns, for example start (column 1, row 1) facing the back, star (column 2, row 4). (One answer: forward, turn right, forward, turn left, forward, forward.)

⚠ Safety

- Turns are slow and on the spot; no spinning.
- The bot never walks off the grid; the tester says "stop" if the next forward card would leave it.

Teacher notes

- The "stand behind the robot" trick is a small version of Papert's idea (from Logo) that children reason about a turtle by imagining they are the turtle.
- Never test left and right words on their own; the card and the trick are enough.

Lesson 3: Find the first wrong card

Unit overview - Previous: Lesson 2: Which way is the robot facing? - Next: Lesson 4: Round the rocks

Goal: Children test a program one card at a time, find the first card that goes wrong (a bug), fix just that, and test again from the start.

Length: about 30 minutes.

Materials

- The 4 by 4 floor grid with the marked front edge.
- Start card and star card.
- One arrow card set per group of three and one program strip per group.
- Job badges: programmer, tester, bot.
- Table grids with a toy robot.
- **Bug programs:** three program strips filled in with cards (or drawn arrows), labelled A, B and C as below, one set per group (copies are fine), plus one strip for the closing check.
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile arrow cards and a raised-edge table grid.

Steps

✎ Opening (5 min)

"A **bug** is a mistake in a program. Every programmer gets bugs. The tester's job is to find the **first** card where things go wrong."

Show the tester's way to test:

1. Bot on the start. Tester puts a finger on the first card.
2. Bot does that card. Is it still OK? Move the finger to the next card.
3. As soon as something goes wrong, say "Bug!" and keep the finger on that card.
4. Programmer fixes **one** card. Bot goes back to the start. Test the whole program again.

✎ Main activity (17 min)

All three bug programs are for the same route: start (column 1, row 1), bot facing the back; star (column 3, row 3). The right program is forward, forward, turn right, forward, forward. Do not show the right program; groups find it by fixing.

- **Bug A (a step is missing):** forward, turn right, forward, forward. What happens: the bot stops on (column 3, row 2), one square in front of the star. The first wrong card is the turn right: it comes one forward too early. Fix: put one more forward card before the turn.
- **Bug B (an extra step):** forward, forward, forward, turn right, forward, forward. What happens: the bot goes one row too far before turning and ends on (column 3, row 4), just behind the star. The first wrong card is the third forward card. Fix: take it out.

- **Bug C (a wrong turn):** forward, forward, turn left, forward, forward. What happens: after the turn, the next forward card would take the bot off the grid; the tester says "stop". The first wrong card is the turn left. Fix: swap it for turn right.

Groups test A, B and C in any order, fix, and retest from the start each time. Swap badges between bugs. Early finishers make a bug program for another group (one wrong card only).

✓ Discussion questions (with answers) (4 min)

- "Why do we go back to the start after a fix?" (The program runs from the start every time; testing from the middle can hide another bug.)
- "In bug A, no card was wrong on its own. What was wrong?" (A card was missing: the program needed one more forward before the turn.)
- "Is finding a bug a bad thing?" (No. Finding bugs is part of programming; that is what testers are for.)

✓ Closing check (with answers) (4 min)

Toy robot on (column 1, row 1) facing the back; star on (column 3, row 3). Show the program: forward, turn right, forward, forward. Ask: "Where will it stop?" Children point. Then: "What card is missing, and where does it go?"

Answer: it stops on (column 3, row 2). One more forward card is needed before the turn right.

Vocabulary

bug, test, debug (find and fix a bug), first, missing, extra.

Differentiation

- **Support:** the child works with a partner on a table grid and moves the toy one card at a time, touching each card as they go.
- **Stretch:** the child says what kind of bug it is: missing, extra or wrong turn.

⚠ Safety

- The tester says "stop" before a forward card would take the bot off the grid.

Teacher notes

- Bug A is the hardest, because the first card that goes wrong is a correct card in the wrong place. Accept "the turn is too early" or "we need another forward" as right.
- In kindergarten, children met a missing or extra arrow card (Argon's robot unit) and one wrong card in a pattern (the patterns unit). This lesson puts all three kinds together on one route.

Lesson 4: Round the rocks

Unit overview - Previous: Lesson 3: Find the first wrong card - Next: Lesson 5: Spot the repeat

Goal: Children plan a longer route round two "rocks", and see that more than one program can be right.

Length: about 30 minutes.

Materials

- The 4 by 4 floor grid with the marked front edge.
- Start card and star card.
- **Two "rocks"** per grid: cushions, beanbags or small boxes (on a table grid, two small blocks or drawn rocks).
- One arrow card set per group of three (8 forward, 3 turn left, 3 turn right) and one program strip per group.
- Job badges: programmer, tester, bot.
- Table grids with a toy robot.
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile arrow cards and a raised-edge table grid (rocks as raised blocks).

Steps

✎ Opening (5 min)

Put the start on (column 1, row 1), bot facing the back, and the star on (column 4, row 4). Put rocks on (column 1, row 3) and (column 3, row 1). "The bot can't go through a rock. If a forward card would take it onto a rock, the tester says stop: that's a bug."

Ask a child to trace one way with a finger in the air. Ask another child for a different way.

✎ Main activity (17 min)

Groups of three with badges. Same start, star and rocks for every group.

1. **Plan and write (6 min).** The programmer, helped by the group, traces a route with a finger on the table grid first, then lays out the cards.
2. **Test and fix (6 min).** Tester runs it one card at a time, as in lesson 3. Fix and retest from the start.
3. **Compare (5 min).** Two groups show each other their programs. Are they the same? Do both reach the star?

Two right programs (there are others):

- forward, turn right, forward, forward, forward, turn left, forward, forward (8 cards: along row 2, then up column 4);

- forward, turn right, forward, turn left, forward, forward, turn right, forward, forward (9 cards: up column 2, then along row 4).

Any program that reaches the star without touching a rock or leaving the grid is right. Early finishers move one rock and write a new program.

✓ Discussion questions (with answers) (4 min)

- "Our programs were different. Can both be right?" (Yes. Both reach the star without hitting a rock.)
- "Is the shortest program the only right one?" (No. Shorter can be quicker to write and test, but any program that works is right.)
- "How did tracing with a finger help?" (We planned the route before choosing the cards, so fewer bugs.)

✓ Closing check (with answers) (4 min)

Same grid, rocks and start. Show two programs:

- Program 1: forward, forward, forward.
- Program 2: forward, turn right, forward, forward, forward, turn left, forward, forward.

Ask: "Which one reaches the star? What happens to the other?" Children point or hold up one or two fingers.

Answer: program 2 reaches the star. Program 1 bumps into the rock on (column 1, row 3) on the second card, and anyway it has no turn, so it could never reach the star.

Vocabulary

route, obstacle (rock), plan, more than one way.

Differentiation

- **Support:** the group uses one rock only (on (column 3, row 1)); then "forward, forward, forward, turn right, forward, forward, forward" works (up column 1, along row 4).
- **Stretch:** find the program with the fewest cards, and a second program with a different route.

⚠ Safety

- Rocks are soft (cushions or beanbags) on the floor grid; bots step round them, never over them.

Teacher notes

- Kidbots notes that there can be more than one correct way to program a solution. Make a point of praising two different right programs side by side.
- Some groups will want to count cards; that is fine as a way to compare, but not as a way to say one program is "wrong".

Lesson 5: Spot the repeat

Unit overview - Previous: Lesson 4: Round the rocks

Goal: Children spot forward cards that repeat and use a **repeat** card to write them once; groups show a program; one-to-one check over the week.

Length: about 30 minutes, plus the one-to-one check (about 4 minutes per child, spread over the week).

Materials

- The 4 by 4 floor grid with the marked front edge.
- Start card and star card; two rocks.
- One arrow card set per group of three and one program strip per group.
- **Repeat cards:** one each of repeat 2, repeat 3 and repeat 4 per group (a loop arrow with a big number).
- Job badges: programmer, tester, bot.
- Table grids with a toy robot.
- For the stretch only: a piece of string or wool per group, to make a loop round a group of cards.
- **Check things:** a table grid with a toy robot, start and star cards, arrow cards, a repeat 3 card, two filled-in program strips (forward, forward, turn right, forward; and forward, turn left, forward, forward, forward) and the record sheet (class list with five columns).
- Optional: a programmable floor robot, with a grid sized to match how far it moves for one press.
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile arrow cards, tactile repeat cards for 2, 3 and 4 (a raised loop and 2, 3 or 4 raised dots), raised blocks for the rocks and a raised-edge table grid.

Steps

✎ Opening (3 min)

Show a program on the board: forward, forward, forward, turn right, forward, forward, forward. "That's a lot of cards. Can you see something that happens again and again?" (Three forwards, twice.)

Show the repeat 3 card: "This card means: do the **next** card three times." So repeat 3, forward is the same as forward, forward, forward.

✎ Main activity (15 min)

1. **Same route, fewer cards (5 min).** Start (column 1, row 1), bot facing the back; star (column 4, row 4); no rocks. Groups run the long program above, then rewrite it as: repeat 3, forward, turn right, repeat 3, forward (5 cards instead of 7). Run it again. (Both end on the star.)

2. **Rewrite a rock route (6 min).** Rocks back on (column 1, row 3) and (column 3, row 1). Groups take the lesson 4 program forward, turn right, forward, forward, forward, turn left, forward, forward and rewrite it with repeat cards. (One answer: forward, turn right, repeat 3, forward, turn left, repeat 2, forward.) Test it from the start.
3. **Own route (4 min).** Groups place the star anywhere and write a program that uses at least one repeat card.

Robot show (7 min)

Each group (or as many as time allows) shows its own route: the programmer shows the cards, the tester runs them, the class says "star!" if the bot arrives. Groups who prefer can show on a table grid. If the school has a floor robot, one group enters its program on the robot's buttons, following the robot's own instructions, and the class predicts where it will stop before it runs.

✓ Closing check (with answers) (5 min)

Show: forward, forward, turn left, forward, forward, forward, forward. Ask: "Which cards can a repeat card replace, and which repeat card?" Children point or hold up the number with fingers.

Answer: the four forwards at the end become repeat 4, forward. The first two forwards could also become repeat 2, forward.

Then the one-to-one check, over the week (see the unit overview, Assessment).

Vocabulary

repeat, loop, the same again.

Differentiation

- **Support:** use only repeat 2 and repeat 3, and only with forward cards.
- **Stretch:** repeat a **group** of cards. Make a string loop round the four cards forward, turn right, forward, turn left and put a repeat 3 card in front. From (column 1, row 1) facing the back, this "staircase" ends on (column 4, row 4) facing the back.

⚠ Safety

- As before: walk, one square per card, stop before leaving the grid or touching a rock.
- A floor robot is used on the floor grid only, away from table edges.

Teacher notes

- A repeat card is a first step towards loops, which come back in grade 2 and in later computing units. Keep it to one repeated card for most children.
- In the one-to-one check, items 1 and 4 use the two filled-in program strips and a table grid; check that the toy faces away from the child at the start.

Grade 1 Computing: Picture Charts and Keeping Information Private (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 10 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard, though it was written after reading four grade K-2 computing standards and one grade 1 maths standard (see Sources). Check the privacy and device notes against your school's rules.
>
> Text-checked by two other agents (Gemini 4 Argon, GLM-5.3 Flash); see Known gaps.

Back to the grade 1 year plan - Term 3

It follows Gemini 4 Argon's grade 1 term 1 unit, Symbols, Signals, Sorting, and Step-by-Step Recipes (sorting by one attribute at a time), and the term 2 unit, Programming a Floor Robot. Argon's grade 2 unit, Repeating Patterns, Treasure-Map Debugging, and Keeping Information Safe, builds on lessons 4 and 5.

This unit is "unplugged": it needs no device. The pictures come from Little Hill, the made-up village used in other grade 1 units (its park, its bakery and Duck from the arts term 3 story).

Big idea

Computers store and show information. When we sort and count things, we can show the numbers as a chart, and the same numbers can be shown in more than one way. Some information about a person is private: we keep it to ourselves, and a password is a secret that keeps things locked.

Outcomes

By the end of the unit, most children can:

1. Sort a set of picture cards into up to three groups and count each group.
2. Make a picture chart with one picture in each box, every column starting from the same line, and use it to say how many are in each group, how many altogether, and how many more are in one group than another.
3. Show the same numbers a second way (tally marks or cube towers), say that the answers match, and spot a chart that is not fair because its boxes are different sizes.
4. Spot a pattern in a chart and use it to make a prediction, saying that it is a guess, not a promise.
5. Say that where someone lives, their password, their phone number and pictures of them are private, and that if a screen or someone they do not know asks for these, they stop and ask a trusted grown-up.
6. Say what a password is for, keep a password secret, show that a longer picture password is harder to guess, and show how to log off.

Prior knowledge

- Grade 1 term 1 computing: sorting objects by one attribute at a time.
- Counting to 20 and writing numbers to 10 (grade 1 maths term 1). Comparing two numbers ("more", "fewer") from kindergarten.
- Health and PE term 3 (lesson 4): "stop and tell a grown-up" for things children are not sure about. Lesson 4 here uses the same idea.
- Children do not need to read: every card is a picture.

Lessons

Lesson	Title	Time	Core idea
1	Sort, count, chart	30 min	Sorting picture cards into three groups and putting them on a picture chart
2	The same numbers, three ways	30 min	Picture chart, tally marks and cube towers tell the same story; spotting an unfair chart
3	Our class vote and the bakery pattern	30 min	Collecting a class vote without names; reading a pattern to make a prediction
4	Is it private?	30 min	Information that is private; stop and ask a trusted grown-up
5	Picture passwords and logging off	30 min	Passwords keep things locked; longer is harder to guess; logging off; one-to-one check

Timings: lessons 1-4 are 30 minutes (5 + 17 + 4 + 4); lesson 5 is 30 minutes (3 + 15 + 7 + 5, with the check spread over the week).

The picture chart

- **Chart grid:** a large sheet with three columns, each ten boxes high, all boxes the same size (about 8 cm square). A thick **start line** runs along the bottom. Under each column is a label space for a picture card (not only a word).
- **Rule:** one picture in each box, starting from the box just above the start line, with no gaps. This makes columns that can be compared by looking.
- **Small chart grids:** the same layout on paper (boxes about 4 cm), one per pair, for lessons 1, 2 and the check.

Materials

Whole class unless noted.

- The large chart grid (above) and one small chart grid per pair.
- **Garden card set** (lessons 1 and 2): one per pair, 16 small picture cards from the Little Hill park: 7 bees, 4 ladybirds and 5 snails. Each kind has a different outline as well as a different colour (a bee is striped, a ladybird is round with spots, a snail has a spiral shell). One large set for the teacher.
- **Three label cards** (bee, ladybird, snail), large and small sets.
- **Interlocking cubes:** 16 per pair (any colours; lesson 2).
- Whiteboard and pens for tally marks.
- **The unfair chart** (lesson 2): a poster showing pond cards made by the teacher, 14 pond picture cards (6 frogs, 5 ducks, 3 fish) and a spare chart grid to fix it (see lesson 2).

- **Two small closing-check charts** (lesson 2): frogs 6, ducks 5, fish 3; and frogs 5, ducks 6, fish 3.
- **Story choice** (lesson 3): three picture books from the class library (the teacher chooses) and their covers as label cards; one cube per child; a "not voting today" spot.
- **Little Hill bakery chart** (lesson 3): a poster (see lesson 3).
- **Duck puppet** (lesson 4): a stick puppet or picture of Duck from the arts term 3 story, or any class puppet named Duck.
- **Duck's question cards** (lesson 4): eight cards, plus two closing-check cards (see lesson 4).
- **"OK" and "Stop and ask a grown-up" cards** (lesson 4): one of each per child (a green tick and a red hand; the pictures matter, not the colours).
- **Locked box** (lesson 5): a box with a lid and a paper "lock" sign; something fun inside (for example a class sticker sheet or the next story book).
- **Password picture cards** (lesson 5): four large cards (sun, moon, star, cloud), plus a small set of the four per pair.
- **Paper tablet** (lessons 4 and 5): one for the teacher in lesson 4; in lesson 5 one per pair, an A4 card drawn as a tablet screen with a "log off" button picture (a door with an arrow).
- **Check things** (lesson 5): a small chart grid, a 9-card garden set (4 bees, 2 ladybirds, 3 snails), the check chart (bees 6, ladybirds 3, snails 5) and two tally pictures (6, 3, 5 and 6, 5, 3; see lesson 5), the bakery chart, question cards 1 and 2 from lesson 4, the four small password cards, a paper tablet, and the record sheet (class list with six columns).
- Optional, for blind or low-vision children: tactile garden cards (raised outlines: stripes, spots, a spiral), a chart grid with raised lines and a raised start line, cubes for every chart, and tactile password cards (a raised circle for the sun, a crescent, a star shape and a cloud shape).
- Ear defenders and a quiet spot, as in every unit.

⚠ Safety and access

- **Privacy first.** Never ask children for their real address, phone number, full name with school, passwords, or photographs, in any lesson, even as an example. All examples are Duck's. The class vote uses cubes, not names.
- **Passwords are practice only.** The picture passwords in lesson 5 are for the locked box game. Never ask children to tell or write a real password. If a child says a real password aloud, say kindly, "That's a secret one: let's keep it secret," and move on; tell the family if the school's policy says so.
- **Disclosure.** If anything a child says during lesson 4 suggests they are at risk online or offline, follow the school's safeguarding procedure.
- **Voting is opt-in.** "Not voting today" is always fine and is never commented on.
- **Cubes:** small cubes can be a choking hazard for children who mouth objects; use large cubes or picture cards for those children.
- **Every way of answering counts:** pointing, holding up a card, eye-gaze, sign, AAC or speech. Children never need to read or write words.
- **Blind or low-vision children:** tactile cards and raised charts (above); cube towers let children compare by touch. A partner can describe a chart column by column.
- **Colour vision:** every card differs by shape as well as colour; the "OK" and "Stop" cards use a tick and a hand.
- **Deaf or hard-of-hearing children:** picture cards and pointing carry every task; in lesson 5 the password keeper shows the secret to the teacher instead of whispering.

Assessment

Lesson 5 includes a six-part check, done one-to-one (about 5 minutes each child; spread over the week). Record each part as **yes**, **with help** or **not yet**:

1. **Sort and chart** (outcomes 1 and 2): the child sorts the 9-card set (4 bees, 2 ladybirds, 3 snails) onto a small chart grid. (Yes if each kind is in its own column, one card per box, from the start line.)
2. **Read the chart** (outcome 2): using the chart the child just made: "Which has the most?" (bees) "How many altogether?" (9) "How many more bees than ladybirds?" (2)
3. **Same numbers** (outcome 3): show the check chart (bees 6, ladybirds 3, snails 5) and two tally pictures, one matching (6, 3, 5) and one not (6, 5, 3). The child points to the matching tally.
4. **Pattern** (outcome 4): on the bakery chart, "Next Wednesday, will the bakery sell a lot of loaves or a few?" (A lot; yes if the child points to the market-day columns or says Wednesdays are always busy. A child who adds "but it's a guess" shows the whole idea.)
5. **Private** (outcome 5): question cards 1 (pick a colour for Duck's car: OK) and 2 (type Duck's home address: stop and ask a grown-up).
6. **Passwords and logging off** (outcome 6): "Duck's friend asks for Duck's password. What should Duck do?" (Keep it secret; tell only a trusted grown-up.) "Which is harder to guess: a one-picture password or a three-picture password?" (three). Then the child points to the log off button on the paper tablet.

Doing it in their own way (pointing, moving cards, the child's usual access) counts as **yes**. "Not yet" is normal for some children; data and privacy return in grade 2.

Sources

- Computer Science Teachers Association, CSTA K-12 Computer Science Standards (2017), progression chart: https://csteachers.org/wp-content/uploads/2025/06/2017-csta-k-12-standards-progression-chart.pdf (read 10 November 2026). Level 1A (ages 5-7) standards used:
  - 1A-DA-06: "Collect and present the same data in various visual formats." (Lessons 1-3.)
  - 1A-DA-07: "Identify and describe patterns in data visualizations, such as charts or graphs, to make predictions." (Lesson 3.)
  - 1A-NI-04: "Explain what passwords are and why we use them, and use strong passwords to protect devices and information from unauthorized access." (Lesson 5.)
  - 1A-IC-18: "Keep login information private, and log off of devices appropriately." (Lessons 4 and 5.)
- Common Core State Standards for Mathematics, grade 1, Measurement and Data, 1.MD.C.4: "Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another." https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/1/MD/ (read 10 November 2026). This is why every chart in lessons 1, 2 and the check has three groups.
- The garden cards, the pond cards, the bakery numbers and Duck's question cards are examples made up for this unit, not from a source.

Known gaps

- Written 10 November 2026. Text-checked the same day by Gemini 4 Argon (links, timings, counts and arithmetic, source quotes, access and privacy safeguards; one capital-letter typo) and GLM-5.3 Flash (timings, counts, materials, sources fetched and quotes matched, privacy and safety; one optional note, that the pairs' three-picture password should also use different pictures). Both were fixed in 312d186, which Gemini 4 Argon also diff-checked the same day (see PEERCHECKS.md). Not yet checked by a teacher.
- **Standards read, not aligned.** Four CSTA level 1A lines and one Common Core line were read and quoted; the unit was not checked against them by anyone else, and other level 1A data and privacy lines (for example 1A-DA-05, storing and changing data on a device) are not covered.
- **No device.** Logging off is practised on a paper tablet. Schools with devices should practise their own real log-off steps.
- **The bakery chart has five days**, more than the three groups in 1.MD.C.4. It is used only for spotting a pattern, not for "how many more" questions.
- **"Private" is kept simple.** Grade 2 sorts information into more careful groups (sharing with permission); this unit only separates "OK" from "stop and ask a grown-up".
- **The password game is a model.** Real passwords for young children are usually set up by adults; the game is about why longer passwords are harder to guess, not a password-making lesson.

Lesson 1: Sort, count, chart

Unit overview - Next: Lesson 2: The same numbers, three ways

Goal: Children sort a set of picture cards into three groups, count each group and put the cards on a picture chart, then answer questions from the chart.

Length: about 30 minutes.

Materials

- The large chart grid with its start line, and the teacher's large garden card set (7 bees, 4 ladybirds, 5 snails) with the three large label cards.
- One garden card set (16 cards), one small chart grid and one set of small label cards per pair.
- Optional, for blind or low-vision children: tactile garden cards and a chart grid with raised lines and a raised start line.
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

Show the large garden cards all jumbled on the floor. "These are the little animals Hen saw in the Little Hill park today. Hen wants to know: which did she see the most of? It's hard to tell when they're all mixed up. How could we find out?" Take ideas (sort them, count them).

Remind children of term 1: "We sorted things by **one rule at a time**. Today our rule is: what kind of animal is it?"

✎ Main activity (17 min)

1. **Sort (3 min).** With the class, sort the large cards into three piles: bees, ladybirds, snails. Put a label card by each pile.
2. **Count (3 min).** Count each pile together, touching each card. (Bees 7, ladybirds 4, snails 5.)
3. **Chart (4 min).** Put the label cards under the three columns of the large chart grid. Show the rule: "One card in each box. Start just above the start line. No gaps." Volunteers place the cards. Ask: "Can you see which column is tallest without counting?" (Bees.)
4. **Pairs (7 min).** Each pair sorts its own garden set and makes the same chart on a small grid. Walk round and check the rule: one card per box, from the start line, no gaps. Pairs who finish ask each other a question from the chart ("Which has the fewest?").

✓ Discussion questions (with answers) (4 min)

- "How many bees? Ladybirds? Snails?" (7, 4, 5.)

- "How many animals did Hen see altogether?" (16. Count all the cards, or count on: 7, then 4 more is 11, then 5 more is 16.)
- "Which did she see the most of? The fewest?" (Bees; ladybirds.)
- "How many more bees than ladybirds?" (3. Look across: the bee column has 3 boxes above the top ladybird.)
- "Why do we start every column on the start line?" (So the tallest column really has the most; then we can compare by looking.)

✓ Closing check (with answers) (4 min)

Take two snails off the large chart. "Now which has the fewest?" Children point.

Answer: snails (3 snails; ladybirds still have 4). Put the snails back.

Vocabulary

sort, group, count, chart, column, most, fewest, altogether, how many more.

Differentiation

- **Support:** the child sorts one kind at a time ("Find all the bees"), then places them on the chart while counting aloud with an adult.
- **Stretch:** "If Hen sees 2 more ladybirds, which column will be taller, ladybirds or snails?" (Ladybirds: 6 is more than 5.)

⚠ Safety

- Keep cards flat on tables or the floor; no throwing.
- Pairs sit so that everyone can see and reach the chart; a child using a wheelchair works at a table chart.

Teacher notes

- These numbers are an example made up for this unit, not from a source. The same garden set is used again in lesson 2.
- A **picture chart** (sometimes called a pictogram or pictograph) uses one picture for one thing at this age. Do not use one picture for two things yet.

Lesson 2: The same numbers, three ways

Unit overview - Previous: Lesson 1: Sort, count, chart - Next: Lesson 3: Our class vote and the bakery pattern

Goal: Children show the same numbers as a picture chart, tally marks and cube towers, say that all three give the same answers, and spot a chart that is not fair.

Length: about 30 minutes.

Materials

- The large chart grid with lesson 1's garden chart still on it (7 bees, 4 ladybirds, 5 snails), and the three large label cards.
- Whiteboard and pens.
- One garden card set, one set of small label cards and 16 interlocking cubes per pair.
- **The unfair chart:** a poster of pond cards made by the teacher before the lesson. It has three columns standing on one line, labelled with a frog, a duck and a fish. The **6 frogs** are drawn small and squashed close together, so their column is short. The **5 ducks** are drawn big with gaps between them, so their column is the tallest. The **3 fish** are drawn medium-sized and close together. Make the frog column clearly shorter than the duck column.
- The large chart grid's spare copy (or the back of the large grid) for fixing the unfair chart, and 14 pond picture cards (6 frogs, 5 ducks, 3 fish) the size of the chart boxes.
- **Two small closing-check charts** (made before the lesson): frogs 6, ducks 5, fish 3; and frogs 5, ducks 6, fish 3, drawn with same-sized pictures in boxes from a start line.
- Optional, for blind or low-vision children: tactile garden cards; cubes; tactile versions of the two closing-check charts (raised shapes in boxes); a tactile version of the unfair chart (raised shapes: small ones close together for frogs, big ones spread out for ducks).
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

Point to yesterday's garden chart. "Our chart shows Hen's animals with pictures. Computers can show the same numbers in different ways, too. Today we'll show these numbers two more ways and see if they tell the same story."

✎ Main activity (17 min)

1. **Tally marks (5 min).** On the whiteboard, write the three animal pictures in a row. "A tally mark is one line for one thing. When we get to five, the fifth line goes across the other four, like a gate. Then it's quick to count in fives." Make the tallies together, touching each card on the chart: bees (a gate and 2 lines: 7), ladybirds (4 lines), snails (one gate: 5).
2. **Cube towers (6 min).** Pairs build one tower for each animal, one cube for each card, and stand each tower on its label card. Ask: "Which tower is tallest?" (Bees.) "Line the

towers up side by side. How many cubes taller is the bee tower than the ladybird tower?" (3.)

3. **The unfair chart (6 min).** Show the pond poster. "The Little Hill pond had frogs, ducks and fish. Which column is tallest? So are there the most ducks?" Let children say yes. Then count each column together: frogs 6, ducks 5, fish 3. "There are more frogs than ducks! Why did the duck column look tallest?" (The ducks are drawn bigger and with gaps; the frogs are small and squashed.) Fix it: volunteers put the 14 pond cards on a chart grid, one in each box from the start line. Now the frog column is tallest.

✓ Discussion questions (with answers) (4 min)

- "Do the picture chart, the tallies and the cube towers give the same answers?" (Yes: 7 bees, 4 ladybirds, 5 snails in all three. They are the same numbers shown three ways.)
- "Which way is quickest for counting? For seeing which is biggest?" (Any reason counts. Tallies are quick to count in fives; towers and picture charts are quick for seeing the tallest.)
- "What made the pond chart unfair?" (Pictures of different sizes and gaps, so a taller column did not mean more.)
- "What makes a chart fair?" (Same-size boxes, one picture in each, every column starting on the start line, no gaps.)

✓ Closing check (with answers) (4 min)

Draw on the whiteboard three tallies under the frog, duck and fish pictures: one gate and 1 line, 5 lines drawn as a gate, and 3 lines. "Which picture chart matches?" Hold up two small charts: one showing frogs 6, ducks 5, fish 3; one showing frogs 5, ducks 6, fish 3. Children point.

Answer: the first chart (frogs 6, ducks 5, fish 3).

Vocabulary

tally, tally mark, gate (a group of five), tower, the same numbers, fair, unfair.

Differentiation

- **Support:** the child builds the cube towers by placing one cube on each picture card in a column first, then stacking them.
- **Stretch:** the child draws their own tallies for the pond numbers and checks them against the fixed chart.

⚠ Safety

- Cubes stay on the tables. For children who mouth small objects, use large cubes or skip the towers and use the picture chart.

Teacher notes

- The pond numbers and the poster are an example made up for this unit, not from a source.
- The link to fairness is deliberate: children met "fair" and "not fair" set-ups in health and PE this term, and a chart can be unfair too.
- Make the two closing-check charts before the lesson (small chart grids with pond cards or drawings).

Lesson 3: Our class vote and the bakery pattern

Unit overview - Previous: Lesson 2: The same numbers, three ways - Next: Lesson 4: Is it private?

Goal: Children collect a class vote without names, show it as a cube-tower chart and answer questions about it, then use a pattern in a chart to make a prediction.

Length: about 30 minutes.

Materials

- Three picture books from the class library (the teacher chooses) and a cover picture of each as a label card.
- The large chart grid (cleared), with the three cover cards as labels.
- One cube per child, in a tray, and a "not voting today" spot (a mat or tray beside the chart).
- **The Little Hill bakery chart:** a poster made before the lesson (see below).
- Whiteboard and pens.
- Optional, for blind or low-vision children: tactile cover cards (a different raised shape stuck on each) and a raised-line copy of the bakery chart with a raised marker above each Wednesday.
- Ear defenders and a quiet spot.

The bakery chart. Ten columns in a row, one for each school day over two weeks (Monday to Friday, then Monday to Friday again), each ten boxes high with a start line. Under each column is the day's picture. Each loaf picture is one loaf sold. A small market-stall picture sits above both Wednesdays, because Wednesday is market day in Little Hill.

	Mon	Tue	Wed	Thu	Fri
Week 1	3	4	9	4	5
Week 2	4	3	8	5	4

Steps

✎ Opening (5 min)

Hold up the three books. "Tomorrow I'll read one of these. Let's collect information to choose: a vote. Each person who wants to vote puts one cube on the book they'd like. We don't write names: a vote is just a cube. If you'd rather not vote today, put your cube on the 'not voting' spot. That's fine."

✎ Main activity (17 min)

1. **Collect (5 min).** Children come up a table at a time and stand their cube in the column of the book they choose, building a tower from the start line. (A partner or adult places the cube for any child who points or signs a choice.)

2. **Read the chart (5 min).** Count each tower together and write the numbers under it on the whiteboard. Ask: "Which book got the most votes? How many people voted altogether? How many more votes did the top book get than the next one?" Count the cubes on the "not voting" spot only to check the total if children ask; never say who.
3. **If two books tie:** "We'll read one tomorrow and one the day after."
4. **The bakery pattern (7 min).** Show the bakery chart. "This chart shows how many loaves the Little Hill bakery sold each day for two weeks." Let children look. "What do you notice?" Take ideas, then point to both Wednesdays: "What's special about Wednesday?" (Lots of loaves; the most each week. It is market day.) "Next week, on Wednesday, will the bakery sell lots of loaves or only a few?" (Lots.) "Do we know for sure?" (No. It's a guess from the pattern; for example, rain might keep people at home.)

✓ Discussion questions (with answers) (4 min)

- "Why didn't we write names on the vote?" (We only need to know how many chose each book, not who. Who voted for what can stay private.)
- "How did the chart help us choose?" (The tallest tower showed the most votes without counting everyone again.)
- "What pattern did the bakery chart show?" (Every Wednesday has the tallest column; other days are about the same.)
- "Is a prediction a promise?" (No. It's our best guess from the pattern.)

✓ Closing check (with answers) (4 min)

"The bakery is going to bake extra loaves on one day next week. Point to the day it should choose." Children point to a Wednesday column, and say or sign why.

Answer: Wednesday (market day; the most loaves both weeks). Any child who adds "but it might be different" gets a big thumbs-up.

Vocabulary

vote, collect, information, data, pattern, predict, prediction, guess.

Differentiation

- **Support:** an adult points along the bakery chart's Wednesdays with the child: "Tall... tall."
- **Stretch:** "How many loaves did the bakery sell on the two Wednesdays altogether?" (17.)

⚠ Safety

- Children come to the chart a table at a time to avoid crowding.
- The vote is about books, never about people. Do not run votes on who is liked, who is a best friend, or anything about children's homes or bodies.

Teacher notes

- The bakery numbers are an example made up for this unit, not from a source. Little Hill's bakery is on the map in the society term 3 unit.
- The word **data** can be used for "the information we collected", but children do not need to learn it yet.
- Read the winning book the next day; the vote should count.

Lesson 4: Is it private?

Unit overview - Previous: Lesson 3: Our class vote and the bakery pattern - Next: Lesson 5: Picture passwords and logging off

Goal: Children say which information about someone is private, and practise "stop and ask a trusted grown-up" when a screen or someone they do not know asks for it.

Length: about 30 minutes.

Materials

- The Duck puppet (or a picture of Duck).
- Duck's eight question cards (below), large, each with a simple picture.
- One "OK" card (green tick) and one "Stop and ask a grown-up" card (red hand) per child.
- A paper tablet (one, for the teacher) to hold up when a card says "a game" or "a message".
- **Two closing-check cards** (made before the lesson): "A game asks Duck what its favourite animal is for the game's character" and "A message asks Duck where it lives."
- Optional, for blind or low-vision children: "OK" and "Stop" cards with raised shapes (a raised tick; a raised hand outline) and a partner who reads each question card aloud.
- Ear defenders and a quiet spot.

Duck's question cards (an example, not from a source):

1. A game on the library tablet asks Duck to pick a colour for its race car.
2. A game asks Duck to type its home address.
3. A message from someone Duck doesn't know says, "What's your password?"
4. Duck's teacher asks the class to vote for a story with cubes.
5. A game asks Duck to type its whole name and the name of its school.
6. A website asks Duck to take a photo of itself.
7. Hen asks Duck which picture in a book it likes best.
8. A box pops up: "You won a prize! Type your phone number."

Answer guide: **OK** for 1, 4 and 7; **Stop and ask a grown-up** for 2, 3, 5, 6 and 8.

Steps

✎ Opening (5 min)

Bring out Duck. "Duck has been playing games on the Little Hill library tablet. Some games ask questions. Some questions are fine to answer. Some are about things that are **private**: things we keep to ourselves and our trusted grown-ups."

Remind children of health and PE: "When we found tablets we weren't sure about, what did we do?" (Don't touch, tell a grown-up.) "With private information, it's the same idea: **stop and ask a grown-up**."

✎ Main activity (17 min)

1. **What is private? (5 min).** Say and show: "Private things about a person include: where they live, their phone number, their password, and photos of them. A computer can keep information for a long time and can send it far away, so we are careful what we type or say to a screen." Ask: "Who are trusted grown-ups you could ask at school?" (Children point to staff pictures or name staff; never ask about home.)
2. **Duck's cards (8 min).** Read each card while holding up the paper tablet for the screen ones. Every child holds up "OK" or "Stop". Talk briefly after each: "Why?" (Use the answer guide. For 3: "A password is a secret. Duck never tells it to someone it doesn't know." For 8: "Prizes that ask for private information are tricks.")
3. **Pairs: what should Duck say? (4 min).** Each pair takes card 2, 5 or 8 and acts it with the paper tablet: one is Duck, one holds the tablet. Duck shows "Stop" and says or signs, "I need to ask a grown-up," then goes to the teacher.

✓ Discussion questions (with answers) (4 min)

- "What does private mean?" (Something we keep to ourselves and our trusted grown-ups.)
- "Name one thing that's private." (Where someone lives, their phone number, their password, photos of them. Any one counts.)
- "Why was card 1 OK?" (Choosing a car colour doesn't tell anyone about Duck.)
- "What if Duck isn't sure?" (Stop and ask a grown-up. Asking is never wrong.)

✓ Closing check (with answers) (4 min)

Show two new cards: "A game asks Duck what its favourite animal is for the game's character" and "A message asks Duck where it lives." Children hold up "OK" or "Stop" for each.

Answers: favourite animal for the game character, OK; where Duck lives, Stop and ask a grown-up.

Vocabulary

private, information, password, trusted grown-up, stop and ask.

Differentiation

- **Support:** use only four cards (1, 2, 3, 7) and do them with an adult.
- **Stretch:** "Card 6 asked for a photo. What if Duck's grown-up says it's fine?" (Then it's OK, because a trusted grown-up decided.)

⚠ Safety

- **Never ask children for their own private information**, even as an example, and never ask what games or devices they use at home. All examples are Duck's.

- Keep the tone calm: the aim is "stop and ask", not fear. Do not tell frightening stories about strangers.
- If a child says something that suggests they are at risk online or offline, follow the school's safeguarding procedure.

Teacher notes

- Duck's cards and the closing-check cards are examples made up for this unit, not from a source. They follow CSTA 1A-IC-18, "Keep login information private" (see the unit overview).
- Make the two closing-check cards before the lesson.
- Grade 2 (Argon's unit, lesson 5) sorts information more carefully, including sharing with permission. This lesson keeps to two answers.

Lesson 5: Picture passwords and logging off

Unit overview - Previous: Lesson 4: Is it private?

Goal: Children say what a password is for, keep a password secret, find out by playing that a longer picture password is harder to guess, and practise logging off. The one-to-one check for the whole unit starts this week.

Length: about 30 minutes (the one-to-one check is extra, spread over the week).

Materials

- **The locked box:** a box with a lid and a paper "lock" sign on the front. Put something fun inside before the lesson (for example a class sticker sheet or the next story book).
- **Four large password picture cards:** sun, moon, star, cloud. Each has a different outline as well as a different colour.
- One small set of the four password cards per pair (one sun, one moon, one star, one cloud).
- One **paper tablet** per pair: an A4 card drawn as a tablet screen with a "log off" button picture (a door with an arrow pointing out of it).
- Whiteboard and pens.
- Optional, for blind or low-vision children: tactile password cards (a raised circle for the sun, a crescent, a star shape and a cloud shape) and a paper tablet with a raised "log off" button.
- Ear defenders and a quiet spot.
- **For the one-to-one check** (see the unit overview, Assessment): a small chart grid; a 9-card garden set (4 bees, 2 ladybirds, 3 snails); the check chart (a small chart showing bees 6, ladybirds 3, snails 5); two tally pictures (one showing 6, 3, 5 and one showing 6, 5, 3, each under a bee, a ladybird and a snail picture); the bakery chart from lesson 3; Duck's question cards 1 and 2 from lesson 4; the four small password cards; a paper tablet; and the record sheet (class list with six columns).

Steps

✎ Opening (3 min)

Show the locked box. "Something fun is inside. But the box has a lock. To open it, you need the secret: the **password**." Ask: "What is a password for?" (It keeps something locked so only the right people can open it.) "Tablets and computers have passwords too, to keep our work and our information safe."

✎ Main activity (15 min)

1. **Round 1: a one-picture password (3 min).** Hold up the four large cards. The teacher secretly chooses one picture as the box's password and puts it face down on top of the box. Children take turns guessing by pointing to one large card. After each guess, the teacher turns the guessed card over or says "Not that one." "How many guesses did we need?" (Never more than four, because there are only four pictures.)

Open the box and show what is inside, then close it again. "A one-picture password is very easy to guess."

2. **Round 2: a three-picture password (6 min).** "Let's make the password longer." The teacher secretly lays three **different** pictures in a row, in order, face down (for example star, sun, cloud). To open the box, the guessers must say all three in the right order. Give the class five guesses. Most classes will not find it. "Why was this one so hard?" (There are many more ways to put three pictures in a row.) The teacher can add: "I counted: there are 24 different ways to put three of our four pictures in a row, and only 4 ways with one picture." Children do not need to count this themselves. Open the box for everyone at the end.

3. **Pairs play (4 min).** Each pair has a small set of four password cards. One child is the **keeper**: they choose a password of one picture, then (in a second go) three **different** pictures, and **show it to the teacher**, never whispering it to a friend. The teacher looks, nods and keeps it secret. The partner guesses by pointing or laying cards in a row. Swap roles if there is time.

4. **The log-off routine (2 min).** Each pair holds their paper tablet. "When you have finished on a tablet or computer, you **log off**, then put it away." Together: "Finished? Log off, put it away." Children press the door-with-an-arrow button with a finger and put the paper tablet in the box or tray. If the school has class tablets or computers, practise logging off on a real device in a later session with the class's usual login.

✓ Discussion questions (with answers) (7 min)

- "Who can know your password?" (Only you and a trusted grown-up, such as your teacher or a grown-up at home who helps you.)
- "Duck's friend says, 'Tell me your password, I'm your friend!' What should Duck do?" (Keep it secret. Friends don't need it. Duck can tell a trusted grown-up.)
- "Which password was harder to guess, one picture or three pictures?" (Three pictures.)
- "Why do we log off when we finish?" (So the next person can't use our work or see our information.)
- "Did today's game use a real password?" (No, it was a practice password for the box.)

✓ Closing check (with answers) (5 min)

Show two large cards: the sun on its own, and a row of three (moon, cloud, star). "Which password is harder to guess?" Children point. Then: "Duck has finished playing a game on the class tablet. What does Duck do?" Children point to the log off button on their paper tablet (or say or sign "log off").

Answers: the three-picture password is harder to guess; Duck logs off (and puts the tablet away).

Vocabulary

password, secret, lock, guess, log off, private, trusted grown-up.

Differentiation

- **Support:** play round 1 with two pictures first. Children who find guessing in order hard can guess one picture at a time with the teacher saying "yes" or "not that one" for each place (this makes it easier; say so).
- **Stretch:** "How many guesses could a one-picture password need, at most?" (4.) "Would a two-picture password be harder than one picture?" (Yes.) Children can try to list two-picture passwords with cards.
- **Access:** the keeper shows the password to the teacher, so no whispering or listening is needed. Children who do not use their hands can guess by eye-gaze or by saying or signing the picture names; a partner moves the cards. Blind or low-vision children use tactile cards and feel the order left to right.

⚠ Safety

- The passwords in this lesson are practice passwords for the box. Never ask children to say or write a real password (see the unit overview, Safety and access).
- The box holds nothing that can be grabbed and swallowed (no sweets, no small parts).
- The "who can know your password" answer names trusted grown-ups in general. Do not ask children who knows their passwords at home.

Teacher notes

- The password game is an example made up for this unit, not from a source. It follows CSTA 1A-NI-04 ("Explain what passwords are and why we use them, and use strong passwords to protect devices and information from unauthorized access") and 1A-IC-18 ("Keep login information private, and log off of devices appropriately"); see the unit overview.
- The 24 comes from counting: 4 choices for the first picture, 3 for the second and 2 for the third (4 x 3 x 2 = 24). If pictures could repeat, there would be 4 x 4 x 4 = 64. Children do not need either number.
- The one-to-one check (unit overview, Assessment) takes about 5 minutes per child. Do it while the class plays the password game or another quiet task during the week.

Unit: Repeating Patterns, Treasure-Map Debugging, and Keeping Information Safe (Computing, Grade 2)

> **Unreviewed AI draft.** Written by Gemini 4 Argon (2026-11-05). No human teacher has reviewed this unit. All content is CC0 1.0 Public Domain.

Overview

By Grade 2 (`ages 7–8`), students are ready to write longer unplugged programs on paper grids, compress repeating staircases and border paths using **`REPEAT n TIMES`** blocks, compare two different routes to find which one uses fewer steps, and learn an essential real-world computing habit: **which personal information must be kept private vs. when to check context and permission with a trusted adult before sharing creative work**.

Across five 35-minute unplugged lessons, Grade 2 students trace and write arrow programs on 4×4 treasure maps, spot and compress repeating patterns (`↑ → ↑ → ↑ →` becomes `REPEAT 3 TIMES: [ ↑ → ]`), compare short vs. long routes around map obstacles, debug paper treasure maps where one wrong instruction sends the explorer into a swamp or rock wall, and sort fictional character cards into **Check Permission & Context (Class Project Page with Adult & Creator Approval)** vs. **Private Personal Information (Never Post Publicly)** protected by unique, long, unpredictable secrets (passphrases).

Prior knowledge

- Students have experience with `First → Next → Last` ordering, symbols, and single-rule sorting (Symbols, signals, sorting, and step-by-step recipes, Grade 1), and can count and add whole numbers up to 20.
- Helpful cross-links:
- Solids, liquids and melting (Science, Grade 2) uses step-by-step observation logs and reversible/irreversible state changes.
- Maps, routes and places (Society, Grade 3) extends grid navigation with map legends and compass directions.
- Leads to: Inputs, outputs, loops, and debugging (Computing, Grade 3) and Computing & systems progression.

Learning goals

By the end of this unit, a student can:

1. Write and trace a cardinal-arrow program (`↑ North`, `↓ South`, `→ East`, `← West`) on a 4×4 grid to navigate from a Start square to a Treasure Chest while avoiding obstacle squares (Lesson 1).
2. Identify a repeating group of steps in a long arrow program and rewrite it using a **`REPEAT n TIMES`** block, counting how many arrows were saved (Lesson 2).
3. Compare two different valid algorithms that reach the same goal on a 4×4 map and determine which route takes fewer steps (Lesson 3).

4. Find and repair the exact step (**bug**) where a broken map program hits an obstacle or misses the treasure, and verify the repair by tracing from the start (Lesson 4).
5. Sort fictional character examples into **Check Permission & Context Before Sharing** (like a classroom drawing or project puzzle shared only with creator and trusted-adult permission) vs. **Private Personal Information** (like a home street address, phone number, schedule, or account password that must never be posted), and explain why a real passphrase must be unique, long, and unpredictable—and never copied from a printed example (Lesson 5).

Lesson sequence

Lesson	Title	Time	Core idea
Lesson 1	Treasure-Map Grids: Following and Writing Arrow Programs	35 min	A grid algorithm uses exact directional arrows (`↑`, `↓`, `→`, `←`) to reach a goal without hitting obstacles
Lesson 2	Staircases and Borders: Shrinking Programs with `REPEAT`	35 min	When steps repeat in a pattern (`↑ → ↑ → ↑ →`), a **`REPEAT n TIMES`** loop makes the program shorter and clearer
Lesson 3	Two Roads to the Treasure: Comparing Short and Long Routes	35 min	More than one algorithm can solve the same problem; we can compare routes by counting total steps
Lesson 4	Map Bug Detectives: Tracing and Fixing Broken Routes	35 min	**Debugging** means stepping through a map program one square at a time to find and fix the exact wrong arrow
Lesson 5	Public vs. Private: Keeping Personal Information Safe	35 min	Private personal details and passwords must never be posted publicly, and even creative work requires checking context and permission with a trusted adult

Materials for the whole unit

- Printed or hand-drawn 4×4 grid maps (one per student or pair; ASCII diagrams included in every lesson)
- Pencils, erasers, and large paper boat or cardboard tokens (`at least 5 cm wide`) to slide across grid squares (with pointing, verbal/dictated, or tactile card options available in every lesson)
- Green and Red crayons or markers (for Lesson 5's Public vs. Private sorting cards)

Assessment summary

Each lesson ends with a 3-question exit check with complete worked solutions (which students may complete in writing, by pointing, or orally/dictated). In Lesson 5, students complete a 3-question exit check covering a 4-option privacy sort, a passphrase comparison, and a 4×4 grid loop trace.

Sources

These references provide teacher background for the concepts in this Grade 2 unit. All links were checked to load on 2026-11-05.

- Algorithm (step-by-step problem-solving procedure): https://en.wikipedia.org/wiki/Algorithm — background for Lessons 1 and 3.
- For loop (count-controlled repetition in programming): https://en.wikipedia.org/wiki/For_loop — background for Lesson 2's `REPEAT n TIMES` compression.
- Debugging (tracing and fixing errors in a program): https://en.wikipedia.org/wiki/Debugging — background for Lesson 4's step-by-step map trace.
- Information privacy (distinguishing personal data that requires protection): https://en.wikipedia.org/wiki/Information_privacy — background for Lesson 5's private vs. public information sort.
- Password (secret word or phrase used to protect access): https://en.wikipedia.org/wiki/Password — background for Lesson 5's strong passphrase activity.
- Bell, T., Witten, I. H., & Fellows, M. (2015). CS Unplugged (general pedagogical reference for unplugged computing; all text, maps, and activities in this unit are original CC0 work): https://www.csunplugged.org/

Known gaps and cautions

- **Unreviewed AI draft:** This unit has not yet been reviewed by a human Grade 2 teacher or classroom-tested with 7-to-8-year-old students.
- **Cardinal Grid Arrows (`↑ ↓ → ←`) vs. Relative Robot Turns:** In Grade 2, map arrows move the token 1 square in the arrow's direction on the page (`↑` = 1 square Up/North on the map, `→` = 1 square Right/East on the map). Relative body turns (`TURN LEFT 90°` while keeping track of which way the robot's nose is pointing) are separated into Kindergarten physical floor play and Grade 3 Computing so Grade 2 students can focus cleanly on loop compression and route comparison on paper grids.
- **Privacy discussion sensitivity (Lesson 5):** During Lesson 5, remind students **never to say or write their real home address, real phone number, or real family passwords** out loud or on their worksheets. All sorting cards use fictional storybook characters (like "Barnaby Bear's cave address").

Lesson 1: Treasure-Map Grids — Following and Writing Arrow Programs

- **Unit:** Repeating Patterns, Treasure-Map Debugging, and Keeping Information Safe (Computing, Grade 2)
- **Time:** 35 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will trace and write a sequence of directional arrows (`↑`, `↓`, `→`, `←`) on a 4×4 grid map to move a ship token from a Start dock (`S`) to a Treasure Chest (`T`) without landing on Rock (`#`) squares.

Materials

- Whiteboard or chart showing the 4×4 Harbor Map below
- Per pair: printed 4×4 grid sheets, pencils, and a large paper boat or cardboard token (`at least 5 cm wide`, or tactile arrow cards)

Vocabulary

- **Grid Map:** A square map divided into rows and columns where each move steps into a neighboring square.
- **Program:** A list of arrow instructions written down in order for a computer or player to follow.
- **Obstacle (`#`):** A blocked square (like a sharp rock or swamp) that our token must steer around.

Lesson flow

✎ 1. Opening: Reading the 4 Arrow Commands (7 min)

1. Draw the four map arrows on the board:
2. `↑` **(Up / North):** Move 1 square up toward the top of the page.
3. `↓` **(Down / South):** Move 1 square down toward the bottom of the page.
4. `→` **(Right / East):** Move 1 square right.
5. `←` **(Left / West):** Move 1 square left.
6. Draw this 4×4 Harbor Map on the board (`S` = Start Dock at bottom-left, `T` = Treasure Island at top-right, `#` = Sharp Rocks):

```
Row 4 (Top):    [ . ]  [ # ]  [ . ]  [ T ]
Row 3:          [ . ]  [ # ]  [ . ]  [ . ]
Row 2:          [ . ]  [ . ]  [ . ]  [ # ]
Row 1 (Bottom): [ S ]  [ # ]  [ . ]  [ . ]
                Col 1  Col 2  Col 3  Col 4
```

1. Ask: "Why can't our boat sail straight right from *`[S]`* (*`Col 1, Row 1`*) using `→ → →`?"

2. Because `[Col 2, Row 1]` has a sharp Rock (`#`)!

✎ 2. Main activity: Tracing & Writing Safe Harbor Programs (18 min)

1. **Whole-Class Trace (6 min):** Test this 6-arrow program together by moving a magnet or drawing dots one square at a time from `[S]` (`Col 1, Row 1`): **Program A:** `↑ → → ↑ ↑ →`
2. Arrow 1 (`↑`): Moves from `(Col 1, Row 1)` to `(Col 1, Row 2)` — safe water `[.]`!
3. Arrow 2 (`→`): Moves to `(Col 2, Row 2)` — passes right between the two rocks!
4. Arrow 3 (`→`): Moves to `(Col 3, Row 2)` — safe water `[.]`!
5. Arrow 4 (`↑`): Moves to `(Col 3, Row 3)` — safe water `[.]`!
6. Arrow 5 (`↑`): Moves to `(Col 3, Row 4)` — safe water `[.]`!
7. Arrow 6 (`→`): Moves to `(Col 4, Row 4)` — lands right on **`[T]` Treasure**!
8. **Pair Map Designer & Navigator (12 min):**
9. Give each pair two blank 4×4 grids.
10. **Step 1:** Partner A places `S` in any corner, `T` in the opposite corner, and draws **3 Rocks (`#`)** (making sure at least one open water path still connects `S` to `T`!).
11. **Step 2:** Partner A writes the secret arrow program on the back of their sheet.
12. **Step 3:** Partner B creates their own arrow program (by writing arrows, arranging tactile arrow cards, or dictating directions to their partner), slides the large paper boat token (or points step by step) across Partner A's map, and checks that it reaches `T` without touching any `#`. Then partners switch!

✓ 3. Discussion questions (5 min)

- **Question 1:** "What happens if you place Rocks (`#`) all the way across Row 2 (*`[#][#][#][#]`*)?"
- Example good answer: It builds a solid wall across the whole map so **no** program can ever get from Row 1 to Row 4!
- **Question 2:** "Why is it helpful to touch each square with your pencil tip as you write each arrow?"
- Example good answer: If you try to write 6 arrows in your head without tracking which square the boat has reached, it is easy to lose count by 1 square and hit a rock.

✓ 4. Closing check (5 min)

Look at the 4×4 Harbor Map from the board (`S` at `Col 1, Row 1`):

1. If you start at `[S]` (`Col 1, Row 1`) and follow the program `↑ ↑ ↑`, which square (`Col, Row`) do you land on? Does that square have a Rock (`#`)?
2. From `(Col 1, Row 4)`, why can't you go `→` to reach the Treasure?
3. Write the **last 2 arrows** needed to go from `(Col 3, Row 3)` to the Treasure at `(Col 4, Row 4)`.

Worked answers for closing check

1. Starting at `(Col 1, Row 1)`, `↑ ↑ ↑` moves through `(Col 1, Row 2)` and `(Col 1, Row 3)` to land on **`(Col 1, Row 4)`** (the top-left corner). It is safe water (`[.]`), **no rock**.

2. Because `(Col 2, Row 4)` has a **Rock (#)** blocking the way!
3. ↑ → (go up to `(Col 3, Row 4)`, then right to `[T]` at `(Col 4, Row 4)`), **or** → ↑ (go right to `(Col 4, Row 3)`, then up to `[T]` at `(Col 4, Row 4)`—both squares are open!).

Differentiation

- **Extra support:** Let students move their large paper boat token (or point) 1 square first, record or state that 1 arrow immediately (in writing, by placing an arrow card, or verbally), and repeat until the token is sitting on `T`.
- **Extra challenge:** Add a **Gold Key (K)** square on the map (`Col 4, Row 1`) and require the boat to visit `K` before sailing to the locked Treasure Chest `T`!

Lesson 2: Staircases and Borders — Shrinking Programs with `REPEAT`

- **Unit:** Repeating Patterns, Treasure-Map Debugging, and Keeping Information Safe (Computing, Grade 2)
- **Time:** 35 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will spot repeating groups of arrows inside a grid program, rewrite them using a `REPEAT n TIMES: [ ... ]` loop block, and verify that the long program and the loop program land on the exact same square.

Materials

- 4×4 Staircase Map on the board and student worksheets

Vocabulary

- **Pattern Unit (Core):** The small group of steps that repeats in the same order.
- **`REPEAT n TIMES` (Loop):** A computing instruction that tells the player or computer to run the steps inside the brackets `[ ... ]` exactly `n` times in a row.

Lesson flow

✎ 1. Opening: The Staircase Climb (7 min)

1. Draw a 4×4 Staircase Map where the explorer starts at `S` (`Col 1, Row 1`) and climbs diagonal stairs to `T` (`Col 4, Row 4`):

```
Row 4 (Top):    [ . ]  [ . ]  [ . ]  [ T ]
Row 3:          [ . ]  [ . ]  [ * ]  [ * ]
Row 2:          [ . ]  [ * ]  [ * ]  [ . ]
Row 1 (Bottom): [ S ]  [ * ]  [ . ]  [ . ]
                Col 1  Col 2  Col 3  Col 4
```

1. Write the long 6-arrow staircase program along the `*` squares: **Long Program:** `→ ↑ → ↑ → ↑`
2. Ask: "Read or tap through that arrow list with me: 'Right, Up, Right, Up, Right, Up!' What 2-arrow pattern repeats over and over, and how many times does it repeat?"
3. Pattern: `[ → ↑ ]`, repeated `3` **times**!
4. Write the compressed version right underneath: **Loop Program:** `REPEAT 3 TIMES: [ → ↑ ]`
5. Count the arrows we had to write: the Long Program wrote **6 arrows**, while the Loop Program wrote only **2 arrows** inside the box (`6 − 2 = 4` arrows saved!).

✎ 2. Main activity: Unrolling & Compressing Loops (18 min)

1. **Practice Unrolling a Loop (6 min):**
2. What if a programmer hands you a loop and you want to trace every single step? You **unroll** it!
3. Write on the board: `REPEAT 3 TIMES: [ ↑ ]` followed by `REPEAT 3 TIMES: [ → ]`
4. Unroll it together on the 4×4 grid starting at `S` (`Col 1, Row 1`):
    - First loop (`REPEAT 3 TIMES: [ ↑ ]`) = `↑ ↑ ↑` (climbs straight up the left wall to `Col 1, Row 4`).
    - Second loop (`REPEAT 3 TIMES: [ → ]`) = `→ → →` (walks straight across the top row to `T` at `Col 4, Row 4`!).
5. **Pair Loop Compression Puzzles — Map-Free Symbolic Pattern Puzzles (12 min):** Explain that the next three puzzles are **map-free symbolic pattern puzzles** (we are compressing the repeating symbol sequence itself rather than tracing from `S` on the 4×4 Staircase Map above; students can write, point to, or dictate their answers, and for Puzzle A may tap/point/say the rhythm instead of clapping or jumping):
6. **Puzzle A (Rhythm Pattern — Clap/Tap/Point):** `Clap Clap Jump | Clap Clap Jump | Clap Clap Jump | Clap Clap Jump`
    - Answer: **`REPEAT 4 TIMES: [ Clap Clap Jump ]`** (12 actions shrunk to 1 loop of 3 actions!).
7. **Puzzle B (Symbolic Zig-Zag Arrow Sequence):** `↑ ← ↑ ← ↑ ←`
    - Answer: **`REPEAT 3 TIMES: [ ↑ ← ]`**.
8. **Puzzle C (Symbolic Loop + Extra Step at the End!):** `→ ↑ → ↑ → ↑ →` (7 arrows total)
    - Guide students to see that the first 6 arrows are `REPEAT 3 TIMES: [ → ↑ ]`, followed by one extra `→` outside the loop: **`REPEAT 3 TIMES: [ → ↑ ]` then `→`**.

✓ 3. Discussion questions (5 min)

- **Question 1:** "Does *`REPEAT 3 TIMES: [ → ↑ ]`* do the exact same thing as *`REPEAT 3 TIMES: [ → ]`* then *`REPEAT 3 TIMES: [ ↑ ]`*?"
- Example good answer: Both end up at the top-right corner (`Col 4, Row 4`) if there are no rocks, **but** they walk through completely different middle squares! The first climbs diagonal stairs (`→ ↑ → ↑ → ↑`), while the second walks all the way across the bottom row first (`→ → →`) and then climbs the right wall (`↑ ↑ ↑`).
- **Question 2:** "If a game programmer wants a guard character to walk 100 steps to the right, how does a *`REPEAT`* loop help them?"
- Example good answer: They can write `REPEAT 100 TIMES: [ → ]` in one line instead of drawing 100 separate arrows!

✓ 4. Closing check (5 min)

1. (Map-free symbolic unroll) Unroll this loop into a plain list of arrows: **`REPEAT 4 TIMES: [ ↓ → ]`**. How many total single-square steps does the unrolled list contain?
2. (Map-free symbolic compression) Compress this 8-arrow sequence using a `REPEAT` loop: `↑ ↑ → ← ↑ ↑ → ←`
3. (4×4 grid trace) Start at (`Col 1, Row 1`) on an open 4×4 grid. Where do you land after running **`REPEAT 2 TIMES: [ ↑ → ]`**?

Worked answers for closing check

1. Unrolled: `↓ → ↓ → ↓ → ↓ →`. Since there are `2` arrows inside the box repeated `4` times, the token takes `4 × 2 = 8` **total steps**.
2. **`REPEAT 2 TIMES: [ ↑ ↑ → ← ]`** (the 4-arrow pattern `↑ ↑ → ←` repeats twice).
3. Round 1 (`↑ →`) moves from `(Col 1, Row 1)` → `(Col 1, Row 2)` → `(Col 2, Row 2)`. Round 2 (`↑ →`) moves to `(Col 2, Row 3)` → **`(Col 3, Row 3)`**.

Differentiation

- **Extra support:** Have students draw vertical separator bars `|` between repeating groups (`→ ↑ | → ↑ | → ↑`) before counting how many groups there are.
- **Extra challenge:** Ask students how to write a loop that walks all the way around the outside perimeter of a 4×4 square grid and returns to `S` (`3 steps ↑, 3 steps →, 3 steps ↓, 3 steps ←`).

Lesson 3: Two Roads to the Treasure — Comparing Short and Long Routes

- **Unit:** Repeating Patterns, Treasure-Map Debugging, and Keeping Information Safe (Computing, Grade 2)
- **Time:** 35 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will trace two or more valid grid algorithms that reach the same goal, count the total steps taken by each route, and explain why finding a shorter route matters when energy or time is limited.

Materials

- Printed 4×4 Island Map worksheets (diagram below) and pencils

Vocabulary

- **Route (Path):** The sequence of squares a token visits from Start (`S`) to Treasure (`T`).
- **Step Count (Cost):** The total number of single-square moves (`↑`, `↓`, `→`, `←`) a route takes from start to finish.
- **Efficient:** Finishing the job correctly without wasting extra steps.

Lesson flow

✎ 1. Opening: Two Sailors, One Treasure Island (7 min)

1. Draw this 4×4 Island Map on the board (`S` at `Col 1, Row 2`; `T` at `Col 4, Row 3`; `#` = Reef Rocks):

```
Row 4 (Top):    [ . ]  [ . ]  [ . ]  [ . ]
Row 3:          [ . ]  [ # ]  [ . ]  [ T ]
Row 2:          [ S ]  [ # ]  [ . ]  [ . ]
Row 1 (Bottom): [ . ]  [ . ]  [ . ]  [ . ]
                Col 1  Col 2  Col 3  Col 4
```

1. Two sailors both steer around the Reef Rocks in Column 2 and reach `T` safely without hitting a rock:
2. **Sailor Ava's Program (North Pass via Row 4):** `↑ ↑ → → ↓ →`
3. **Sailor Ben's Program (South Pass via Row 1):** `↓ → → ↑ ↑ →`
4. Trace both on the board:
5. Do **both** sailors reach `T` safely? **Yes!**
6. Count the steps: Ava took **`6` steps**, and Ben took **`6` steps**—a tie!

✎ 2. Main activity: Finding the Shortest Safe Route (18 min)

1. **Why 6 Steps Is the Shortest Here—and How a Route Can Waste Extra Steps (6 min):**
2. Ask: "Can any sailor get from *S (Col 1, Row 2)* to *T (Col 4, Row 3)* in fewer than 6 steps without hitting the Reef Rocks at *(Col 2, Row 2)* and *(Col 2, Row 3)*?"
3. Check together: Because Column 2 is blocked on Rows 2 and 3, every safe route must detour up to Row 4 (like Ava) or down to Row 1 (like Ben: ↓ to Col 1, Row 1 → → Col 2, Row 1 → → Col 3, Row 1 → ↑ Col 3, Row 2 → ↑ Col 3, Row 3 → → Col 4, Row 3), so **6 steps is the shortest possible safe route** on this map.
4. Now test **Sailor Cora's Longer Scenic Route** (where Cora doesn't stop when she first reaches T on step 6): ↑ ↑ → → → ↓ ← →
5. Trace Cora's route (by sliding a large paper token, pointing, or numbering squares): She reaches T at (Col 4, Row 3) on step 6, keeps going by stepping backward off T to (Col 3, Row 3) on step 7 (←), and steps back onto T on step 8 (→)!
6. Cora took **8 steps** (2 wasted back-and-forth steps after already reaching T!).
7. **Pair Battery-Limit Challenge (12 min):** Give pairs a new 4×4 Submarine Map where the submarine only has **5 battery points** (1 battery point = 1 step):

```
Row 4 (Top):    [ . ]  [ . ]  [ # ]  [ T ]
Row 3:          [ . ]  [ . ]  [ . ]  [ . ]
Row 2:          [ # ]  [ # ]  [ . ]  [ # ]
Row 1 (Bottom): [ . ]  [ S ]  [ . ]  [ . ]
                Col 1  Col 2  Col 3  Col 4
```

- S is at **(Col 2, Row 1)**; T is at **(Col 4, Row 4)**.
- Pairs must:
    1. Trace **Route 1:** ← ↑ (hits rock at *Col 1, Row 2*—invalid!)
    2. Trace **Route 2:** → ↑ ↑ ← → → ↑ (steps through (Col 3, Row 1) → (Col 3, Row 2) → (Col 3, Row 3) → (Col 2, Row 3) → (Col 3, Row 3) → (Col 4, Row 3) → (Col 4, Row 4): reaches T safely without hitting any rocks, but takes **7 steps**—runs out of battery!).
    3. Find the **5-step Winner Route** that reaches T using **all 5 battery points with 0 wasted steps**:
        - From S (Col 2, Row 1): → (Col 3, Row 1) ↑ (Col 3, Row 2) ↑ (Col 3, Row 3) → (Col 4, Row 3) ↑ (T at Col 4, Row 4) — exactly **5 steps**!

✓ 3. Discussion questions (5 min)

- **Question 1:** "Can two different programs both be 100% correct even if they use different arrows?"
- Example good answer: Yes! As long as both programs start at S, avoid every obstacle #, and stop on T, both are valid algorithms.
- **Question 2:** "In our map game (where every square costs 1 step and 1 battery point), why does a shorter route help—and when might a real robot or delivery truck choose a longer path in the real world?"
- Example good answer: In our equal-cost grid model where every step costs the same 1 battery point, fewer steps save time and battery power. (In the real world, hills, rough

terrain, traffic, or sharp turns can have different energy costs, so a slightly longer smooth road can sometimes use less battery or be safer!)

✓ 4. Closing check (5 min)

1. On an **open 4×4 grid with no rocks**, starting at `S (Col 1, Row 1)` and aiming for `T (Col 4, Row 3)`, two valid programs both reach `T`:
2. **Program X:** `↑ ↑ → → →`
3. **Program Y:** `→ ↑ → ↓ ↑ ↑ →` How many steps does each program take, and which one is more **efficient** in this equal-step grid model?
4. Look closely at **Program Y** (`→ ↑ → ↓ ↑ ↑ →`). Which two arrows in the middle undo each other and waste 2 steps?
5. If a program takes only `2` steps (`→ →`) but lands on a sharp Rock (#), is it a better solution than a `6`-step program that safely reaches the Treasure (`T`)? Why or why not?

Worked answers for closing check

1. **Program X** takes **`5` steps**; **Program Y** takes **`7` steps**. **Program X** is more efficient because it reaches the goal in 2 fewer steps.
2. The `↓ ↑` in the middle steps down one square and immediately steps right back up to the same square!
3. **No!** A program must first be **correct and safe** (reaching `T` without crashing into #) before we care about how short it is.

Differentiation

- **Extra support:** Have students place a pencil tally mark, point step by step, or place a large paper token on each square as they visit it; any square that gets **two** tally marks shows where the route looped back on itself! Students may give responses in writing, by pointing, or verbally.
- **Extra challenge:** Ask pairs to compare the 5-step Submarine Winner Route (`→ ↑ ↑ → ↑`) against a 5-step attempt that tries to go all the way right on Row 1 first (`→ → ↑ ↑ ↑`—blocked on Step 3 by the rock at `Col 4, Row 2`!) or the valid 7-step Route 2 (`→ ↑ ↑ ← → → ↑`), and prove why `(Col 3, Row 2)` is a mandatory "bridge square" that every valid route on the Submarine Map must pass through.

Lesson 4: Map Bug Detectives — Tracing and Fixing Broken Routes

- **Unit:** Repeating Patterns, Treasure-Map Debugging, and Keeping Information Safe (Computing, Grade 2)
- **Time:** 35 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will step through a broken map program one instruction at a time, circle the exact arrow (**bug**) where the path hits an obstacle or goes the wrong way, and write a working repair.

Materials

- Printed 4×4 Bug Detective worksheets (diagram below) and colored pencils

Vocabulary

- **Bug:** An error in a program that causes it to crash into an obstacle or finish on the wrong square.
- **Trace:** Moving a finger or token step by step through a program while numbering each square (`1, 2, 3...`) to see what the program actually does.
- **Debug:** Finding the exact wrong arrow and fixing it.

Lesson flow

✎ 1. Opening: Why Guessing Doesn't Fix Bugs (7 min)

1. Put this 4×4 Swamp Map on the board (`S` = Start Camp at `Col 1, Row 1`; `T` = Treehouse at `Col 4, Row 4`; `#` = Mud Swamp):

```
Row 4 (Top):    [ . ]  [ . ]  [ . ]  [ T ]
Row 3:          [ . ]  [ # ]  [ # ]  [ . ]
Row 2:          [ . ]  [ . ]  [ . ]  [ . ]
Row 1 (Bottom): [ S ]  [ . ]  [ # ]  [ . ]
                Col 1  Col 2  Col 3  Col 4
```

1. A hiker wrote this 6-arrow program to reach the Treehouse `T`: **Broken Program:** `Step 1: ↑` | `Step 2: →` | `Step 3: →` | `Step 4: ↑` | `Step 5: →` | `Step 6: ↑`
2. Ask: "If we just look at the arrows from across the room, it has three `↑`s and three `→`s, so it looks like it should reach *`(Col 4, Row 4)`*! Why did the hiker get stuck in the Mud Swamp?"
3. **Trace and Number Each Step Together on the Map:**
4. Start at `S (Col 1, Row 1)`.
5. `Step 1 (↑)`: Lands on `(Col 1, Row 2)` — write `1` in that square (safe!).
6. `Step 2 (→)`: Lands on `(Col 2, Row 2)` — write `2` in that square (safe!).
7. `Step 3 (→)`: Lands on `(Col 3, Row 2)` — write `3` in that square (safe!).

8. `Step 4 (↑)`: Moves from `(Col 3, Row 2)` up to **`(Col 3, Row 3)`** — SPLAT! `(Col 3, Row 3)` is a **Mud Swamp (#)**!
9. Circle **`Step 4`** and **`Step 5`**: If we swap Step 4 and Step 5 so the hiker goes `→` **first** (to `Col 4, Row 2`) and **then** `↑ ↑` up Column 4, the hiker walks right around the swamp and reaches `T`!

✎ 2. Main activity: Three Bug-Hunter Cases on the Swamp Map (18 min)

Student pairs trace three broken programs on the Swamp Map above (using a pencil, pointing step by step, sliding a large paper token, or dictating to their partner), identify the step number where the bug happens, and record or state the repaired program:

1. **Case 1 — The Wrong-Direction Bug:**
2. Broken Program: `↑ ↑ ↑ → → ←`
3. Trace: Steps 1–3 (`↑ ↑ ↑`) climb Column 1 to `(Col 1, Row 4)`. Steps 4–5 (`→ →`) walk across Row 4 to `(Col 3, Row 4)`. Then **Step 6 (←)** steps backward to `(Col 2, Row 4)` instead of stepping onto `T`!
4. Bug Location: **Step 6 (←)**.
5. Fix: Change Step 6 from `←` to `→` (`↑ ↑ ↑ → → →`).
6. **Case 2 — The Loop Count Bug (Off-by-One):**
7. Broken Program: `REPEAT 2 TIMES: [ ↑ ]` then `REPEAT 3 TIMES: [ → ]`
8. Trace: `REPEAT 2 TIMES: [ ↑ ]` only climbs 2 squares from `(Col 1, Row 1)` to `(Col 1, Row 3)`. Then the first `→` of the second loop crashes straight into the swamp at `(Col 2, Row 3)`!
9. Bug Location: The first loop said **`REPEAT 2 TIMES`** instead of **`REPEAT 3 TIMES`**.
10. Fix: Change the first loop to **`REPEAT 3 TIMES: [ ↑ ]`** (so the hiker climbs all the way to Row 4 before walking 3 steps right to `T`).
11. **Case 3 — Partner Bug Swap (6 min):**
12. Each student writes a working 6-step program on a clean 4×4 map, intentionally changes **1 arrow** to create a bug, and trades with their partner to trace, circle, and fix.

✓ 3. Discussion questions (5 min)

- **Question 1:** "Why did numbering the squares *`1, 2, 3, 4...`* make it so much easier to fix the Swamp Map than erasing the whole program and starting over?"
- Example good answer: Because Steps `1, 2, 3` were already working! Numbering the squares showed us that only Step 4 and Step 5 needed to be swapped.
- **Question 2:** "In Case 2, what do computer scientists call a bug where a loop runs *`2`* times instead of *`3`* times?"
- Example good answer: An **off-by-one bug** (counting one too few or one too many).

✓ 4. Closing check (5 min)

On the Swamp Map (`S` at `Col 1, Row 1`; Swamp `#` at `Col 3, Row 1`; `T` at `Col 4, Row 4`):

1. A student writes the program: `→ → ↑ → ↑ ↑`. On which step number (`1, 2, 3, 4, 5, or 6`) does the hiker step into a Mud Swamp (`#`), and which square is it?
2. What is wrong with the program `↑ ↑ ↑ → →` on the Swamp Map? (Where does it stop?)

3. How do you fix `↑ ↑ ↑ → →` so it reaches `T` at `(Col 4, Row 4)`?

Worked answers for closing check

1. **Step 2 (→)!** Step 1 (→) moves safely to `(Col 2, Row 1)`, and **Step 2 (→)** steps right into the Mud Swamp `#` at **`(Col 3, Row 1)`**.
2. It stops 1 square short at **`(Col 3, Row 4)`** because it only has two → arrows at the end instead of three.
3. Add one more → at the end (`↑ ↑ ↑ → → →`, or `REPEAT 3 TIMES: [ ↑ ]` then `REPEAT 3 TIMES: [ → ]`).

Lesson 5: Public vs. Private — Keeping Personal Information Safe

- **Unit:** Repeating Patterns, Treasure-Map Debugging, and Keeping Information Safe (Computing, Grade 2)
- **Time:** 35 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will sort fictional character examples into **Private Personal Information** (which must never be posted publicly) vs. **Check Permission & Context Before Sharing** (items that may be shared on a class project page only after checking with a trusted adult and getting the creator's permission), and explain why a real passphrase must be unique, long, and unpredictable—and never copied from a printed example.

Materials

- Per pair (or one shared class set on the board): a set of 8 fictional "Barnaby Bear" sorting cards (listed below)
- Two sorting mats per pair:
- **Green (`Check Permission & Context — Okay for Barnaby's Class Page with Adult & Creator Approval`)**
- **Red (`Private Personal Information — Keep Protected, Never Post Publicly`)**

  Important privacy rule for teachers and students: Never ask students to share, say aloud, or write their real home addresses, phone numbers, or real family/school passwords during this lesson—not even to a teacher or classmate during an activity. All examples use our fictional storybook character, **Barnaby Bear**.

Vocabulary

- **Private Personal Information:** Details that identify where someone lives, how to contact them directly, where they will be at specific times, or how to unlock their accounts (such as a home street address, phone number, school schedule, or login password).
- **Context & Permission Check:** Before sharing even creative work, hobbies, or a project online, checking **who** can see it, **whether** it could identify a child when combined with other clues, and getting **permission from the creator and a trusted adult**. (Hanging a drawing inside our classroom is different from posting it on a public website!)
- **Password / Passphrase:** A secret string of words, letters, numbers, or symbols that protects an account. A strong secret is **unique, long, and unpredictable** (within the account's rules) and is never copied from a public book or worksheet.

Lesson flow

✎ 1. Opening: Hallway Bulletin Board vs. Public Website Fence (7 min)

1. Ask: "If our fictional character Barnaby Bear paints a picture of a purple dragon in art class, is hanging it inside the classroom different from posting it on a public website anyone in the world can see?"
2. Explain: **Yes—context and permission matter!** Inside the classroom, only classmates and teachers see it. On a public website, strangers can see it, and details like a child's name, nickname, or artwork can sometimes identify who made it or where they go to school. Before posting even creative work online, we always **ask the creator's permission and check with a trusted adult**.
3. Ask: "Would Barnaby Bear ever tape the key to his front door, his cave street address, or his family's phone number onto the outside of the school fence for strangers to take?" (`No!` That is **Private Personal Information** and must never be posted!)

✎ 2. Main activity: Helping Barnaby Bear Sort Cards & Choose Safe Passphrase Habits (18 min)

1. **Part A — Barnaby Bear's Webpage Sort (10 min):** Barnaby Bear's teacher is setting up a class project page about Solids, Liquids, and Melting. Each pair receives a set of the 8 fictional Barnaby Bear cards (or the class sorts a shared set together by pointing, speaking, or placing cards) onto their **Green (`Check Permission & Context – Okay with Adult & Creator Approval`)** and **Red (`Private – Never Post Publicly`)** mats:
2. **Card 1:** A photo of an ice-cube experiment chart with no student names or faces → **Green (Check Permission & Context — okay with teacher & creator approval)**
3. **Card 2:** Barnaby's exact home cave street address (`42 Honeybee Lane, Apartment 3B`) → **Red (Private — Never Post)**
4. **Card 3:** A class poll tally showing how many students voted for different states of matter (`Solid, Liquid, Gas`) → **Green (Check Permission & Context — okay with teacher approval)**
5. **Card 4:** Barnaby's tablet login password → **Red (Private — Never Post)**
6. **Card 5:** Barnaby's parent's cell phone number → **Red (Private — Never Post)**
7. **Card 6:** An anonymous 4×4 treasure-map puzzle from Lesson 1 that Barnaby asked to share → **Green (Check Permission & Context — okay with Barnaby's and his teacher's permission)**
8. **Card 7:** The name and street address of Barnaby's doctor and his daily pickup schedule → **Red (Private — Never Post)**
9. **Card 8:** Barnaby's full name, nickname, and personal photo together with his school room number → **Red (Private — identifies a child and their location; keep protected!)**
10. **Part B — What Makes a Secret Passphrase Strong? (8 min):**
11. Barnaby needs a secret passphrase for his fictional tablet account. Compare three fictional examples:
    - Idea 1: **`1234`** (or **`password`**) — a very common counting or dictionary pattern.
    - Idea 2: **`Barnaby`** — his own name, which anyone who knows him could try first.

    - Idea 3: **`ThreeBlueFrogsJump9!`** — an **illustrative classroom example** showing how a **multi-word passphrase** can combine several unrelated words (plus a number or symbol if the account's rules use them).
12. Discuss why **unique, long, and unpredictable** secrets work best:
    - People or automated guessing tools often try common sequences (`1234`, `123456`) and names or facts tied to the owner early on. Using a long, unpredictable phrase that is **unique** to one account makes guessing much harder.
    - **Critical rule about printed examples: Never use `ThreeBlueFrogsJump9!` or any other sample passphrase printed in a lesson, book, or poster for a real account!** Once an example is printed for everyone to read, it is no longer a secret.
13. **How to get help safely without exposing real secrets:**
    - Students should **never** tell or write their real passwords in class or share them with friends or pop-ups. If a student needs help signing in or forgets a password, a trusted adult (parent/guardian or authorized teacher) can help them **reset or manage** the account safely according to school and family rules—without the student ever reading or writing a real password aloud in front of the class.

✓ 3. Discussion questions (5 min)

- **Question 1:** "What should you do if a game or website pops up a box asking for your home street address, your parent's phone number, or your password?"
- Example good answer: Stop typing right away and ask a trusted adult (parent, guardian, or teacher) before entering anything.
- **Question 2:** "Why must you NEVER use a sample passphrase printed on this worksheet (like *`ThreeBlueFrogsJump9!`*) as your real password—even though it is long?"
- Example good answer: Because anyone who reads this worksheet already knows that example! A real passphrase must be a secret that isn't printed in a public lesson.

✓ 4. End-of-unit synthesis & Closing check (5 min)

Students may answer in writing, by pointing/circling, or verbally:

1. **(Lesson 5 — Privacy & Context Sort):** Look at these four fictional items for **Barnaby Bear**. Which **two** items are **Private Personal Information that must NEVER be posted publicly**, and which **two** could be shared on a class project page **only after checking with a trusted adult and getting the creator's permission**?
2. `A. Barnaby's home cave street address`
3. `B. An anonymous photo of a science ice-cube chart (with creator & teacher permission)`
4. `C. Barnaby's tablet login password`
5. `D. An anonymous 4×4 treasure-map puzzle (with creator & teacher permission)`
6. **(Lesson 5 — Passphrase Habits):** Why is **`12345`** a weak password, and why should you also **never** copy a printed worksheet example verbatim as your real password?
7. **(Lessons 1–4 — Grid & Loop Review):** Start at `(Col 1, Row 1)` on a 4×4 grid and run **`REPEAT 3 TIMES: [ → ↑ ]`**. Which square (`Col, Row`) do you land on, and how many total single-square moves did you make?

Worked answers for closing check

1. **`A (Barnaby's home cave street address)`** and **`C (Barnaby's tablet login password)`** are **Private Personal Information** that must never be posted publicly. **`B`** and **`D`** are anonymous project items that may be shared on a class page **only after checking context and getting permission from the creator and a trusted adult**.
2. **`12345`** is a common counting sequence that people or guessing tools try right away; a strong passphrase should be **unique, long, and unpredictable** (following the account's rules). You must also **never** use a printed worksheet example for a real account because anyone who has seen the worksheet already knows it.
3. Each round of `[ → ↑ ]` moves +1 column right and +1 row up. Starting at `(Col 1, Row 1)`, 3 rounds land on **`(Col 4, Row 4)`** and take `3 × 2 =` **`6`** **total single-square moves**.

Grade 2 Computing: Codes and Plans (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 11 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Every picture code and grid route in the answer keys was checked with a small computer script, but not with children. Check the floor space and materials against your school's rules.
>
> Text-checked by two other agents (Gemini 3.8 Flash and Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 2. Builds on grade 1 Programming a floor robot and Picture charts and keeping information private, and Gemini 4 Argon's grade 2 term 1 unit Repeating patterns, treasure-map debugging, and keeping information safe.

This unit is "unplugged": paper grids, crayons, cards and a floor grid. No device is needed.

Big idea

Computers keep information as numbers or other symbols. A picture can be kept as a grid of numbers, and a **key** says what each number means. Before we run a program, we **plan**: what is the goal, what are the steps, and what should happen? Then we run it and compare what happened with the plan. Big jobs are easier to plan when we **break them down** into small, precise steps.

Outcomes

By the end of the unit, most children can:

1. Decode a row of a picture code (0 = blank, 1 = coloured) and colour the matching squares.
2. Write the code for a row of a simple picture.
3. Use a colour-number key to decode a picture, and explain that the same numbers with a different key make a different picture.
4. Break a classroom task into precise steps in the right order, and spot a missing or vague step.
5. Fill in a simple plan (goal, start, steps, what should happen) before running a grid program, then say whether the result matched the plan.

Prior knowledge

- From grade 1: whole programs written before the robot moves; forward, turn left and turn right cards; finding and fixing the first wrong step; reading a picture chart with a key.
- From grade 2 term 1 (Argon's unit): arrow programs on grids, repeats, and debugging a map. This unit does **not** re-teach those; lesson 4 uses the grade 1 floor grid and cards for planning.
- Counting to 10 and reading the digits 0 to 3.

Lessons

Lesson	Title	Time	Core idea
1	Picture codes	30 min	A grid of 0s and 1s can store a picture; each square is a pixel.
2	Colour-number keys	30 min	A key says what each number means; change the key and the picture changes.
3	Break it down	30 min	A big job becomes a list of small, precise steps in order.
4	Plan before you run	30 min	Write the goal and what should happen, then run and compare.
5	Plan, code, swap and check	30 min	Plan a picture code, swap with a partner, compare the result with the plan.

The grids and the codes

- **Picture grid:** 6 by 6 squares on paper (squares about 2 cm), with the rows numbered 1 to 6 down the left side. Each row has a **row code** of six numbers, written in a box next to the row, read from left to right.
- **Two-colour code (lessons 1 and 5):** 0 = leave the square blank, 1 = colour the square in.
- **Colour-number key (lessons 2 and 5):** a small card that says what each number means, for example 0 = white (leave blank), 1 = red, 2 = green, 3 = blue. Write the colour word and stick a crayon-coloured dot beside each number.
- **Small grid (lesson 5):** 4 by 4 squares, so a whole picture fits in the time.
- **Floor grid (lesson 4):** the 4 by 4 floor grid, front edge, start card and arrow cards from the grade 1 robot unit (see The grid and the cards). Answer keys use the same teacher-only names: "column 1" is on the left looking from the front edge, "row 1" is nearest the front edge.

Materials

Whole class unless noted.

- A printed picture zoomed in until its squares show (lesson 1), and a coloured tree picture on a 6 by 6 grid, one per pair (lesson 1).
- Picture grids (6 by 6), printed, several per child, plus one large copy for the board.
- Small grids (4 by 4), two per child.
- Crayons or coloured pencils: red, green, blue, yellow and one dark colour; erasable pencils; a few white sticky squares (lesson 2).
- Colour-number key cards: key A and key B (lesson 2), one of each per pair, and blank key cards (lesson 5).
- Code cards for lessons 1 and 2 (the row codes printed in the lesson answer keys).
- Story cards for lesson 3: "Duck plants a seed" (a picture strip with no words) and step cards for "Mouse puts a book back".
- Large soft building blocks in red, blue and green (one of each per pair, too big to swallow), blank step cards, and a book or folder per pair to stand up as a screen (lesson 3).
- Teacher props for lesson 3: a paper seed packet with a paper-circle seed, a paper pot of scrunched brown paper "soil" and an empty toy watering can.

- Planning sheets (lessons 4 and 5): four boxes labelled Goal, Start, Steps, What should happen, plus a box with a tick and a cross for "Did it happen?"; one large copy for the board.
- Picture-plan sheets (lesson 5): Goal box, a 4 by 4 plan grid, a blank key card and four row-code boxes; plus the teacher's finished heart example.
- The grade 1 floor grid, front-edge marker, start card, a "Hen's house" card, a "puddle" card (extension), a toy letter (a folded paper), arrow cards, program strips and job badges (programmer, tester, bot).
- Table grids (4 by 4 on paper) with a toy or counter, for groups not on the floor grid.
- For the one-to-one check: a 6-square row strip, number cards 0 to 3, key cards A and B, the lesson 3 Mouse cards 1, 2, 4 and 5, a finished planning sheet, a table grid and a toy.
- Optional, for blind or low-vision children: grids with raised lines (glue lines or wikki sticks), felt squares in different textures instead of colouring, tactile arrow cards, blocks with different textures, and number cards, keys and step cards in large print or braille.
- Ear defenders and a quiet spot.

Access and inclusion

- **Numbers stay on the squares.** In colour codes the number is always written in each coloured square (small, in a corner), so a child with colour-vision differences can check the picture by number, not colour.
- **Colouring is not the skill.** A child who finds colouring tiring can place sticky dots, counters or felt squares, or point while a partner colours. Neat colouring is never assessed.
- **Blind or low-vision children:** raised-line grids, felt squares or counters for "1", and codes read aloud or in large print or braille. Pictures are checked by touch.
- **Speaking is optional.** Children can answer by pointing, placing cards, a tick card or their usual communication system.
- **Deaf or hard-of-hearing children:** codes and steps are on cards and the board; the teacher points to each number while reading it.
- **Wheelchair users and walker users:** in lesson 4 the child can move a toy on a table grid, direct a partner, or use bigger floor squares. Being the bot is never required.
- **Left and right:** never test left and right words. The curved arrow on the card, held facing the same way as the robot, gives the answer.

Assessment

Lesson 5 ends with a short one-to-one check (about 3 minutes each child; spread over the week). Record each part as **yes**, **with help** or **not yet**:

1. **Decode a row:** the child colours (or places counters on) a 6-square row with the code 1 0 1 1 0 1. (Answer: squares 1, 3, 4 and 6 coloured.)
2. **Write a row code:** the teacher shows a row with squares 2, 3 and 4 coloured. The child writes or places number cards for its code. (Answer: 0 1 1 1 0 0.)
3. **Explain the key:** the child is shown the code 2 2 3 with key A (0 white, 1 red, 2 green, 3 blue), then with key B (0 white, 1 yellow, 2 blue, 3 green), and says or shows the colours each time. (Answer: green, green, blue; then blue, blue, green.) **Yes** if the child also says or shows that the numbers stayed the same but the key changed.
4. **Break it down:** four step cards for "Mouse puts a book back" are in a muddle and one is missing. The child puts them in order and says or draws the missing step. (Answer in lesson 3.)

5. **Plan and compare:** the child is shown a finished planning sheet and the result of the run (a toy on a table grid), and says whether the result matched "What should happen". (Answer in lesson 5.)

Doing it in their own way counts as **yes**. "Not yet" is normal for some children; codes and planning return in grade 3.

Sources

- Computer Science Teachers Association, CSTA K-12 Computer Science Standards (2017), progression chart: https://csteachers.org/wp-content/uploads/2025/06/2017-csta-k-12-standards-progression-chart.pdf (read 10 November 2026). Level 1A (ages 5-7) lines, quoted exactly; the unit is not a full alignment:
  - 1A-AP-09: "Model the way programs store and manipulate data by using numbers or other symbols to represent information." (lessons 1, 2 and 5)
  - 1A-AP-11: "Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions." (lesson 3)
  - 1A-AP-12: "Develop plans that describe a program’s sequence of events, goals, and expected outcomes." (lessons 4 and 5)
  - 1A-AP-14: "Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops." (lightly, in lessons 4 and 5)
- CS Unplugged, "Image Representation" topic page: https://www.csunplugged.org/en/topics/image-representation/ (read 11 November 2026). "Because computers store data as digits, computer images are ultimately represented inside a computer using just 0's and 1's." The topic recommends first doing lesson 1 of its Binary Numbers topic; this unit does not, and keeps to 0 = blank and 1 = coloured.
- CS Unplugged, "Colour by numbers" (ages 5 to 7, lesson 1): https://www.csunplugged.org/en/topics/image-representation/colour-by-numbers/ (read 11 November 2026). Screens are a grid of small squares called picture elements, or pixels; the lesson shows the word "pixel" coming from "picture elements" and uses black-and-white colouring pages. Lesson 1 uses this idea with its own original pictures. CS Unplugged's printed Pixel Painter sheets are a good alternative to the grids here.

Known gaps and cautions

- Two other agents (Gemini 3.8 Flash and Gemini 4 Argon, both at 53ee78c) text-checked this unit on 2026-11-11 and reported no errors. Those are text checks by AI agents, not a teacher review or classroom test.
- **The pictures, story cards and planning sheet are the author's own examples**, not from a source.
- **Codes here are not binary numbers.** A row such as 0 1 1 0 is a list of on/off squares, not a number. Binary numbers come later, in Argon's grade 6 unit.
- **Lesson 2's colour key is a simplification.** Real screens mix red, green and blue light; this unit does not teach that.
- **Planning sheets need reading support.** Children can draw or use symbol cards in each box.
- **Other level 1A lines** (for example 1A-AP-10 loops and 1A-AP-15 describing choices with correct terms) are touched only lightly.

Lesson 1: Picture codes

Unit overview - Next: Lesson 2: Colour-number keys

Back to the grade 2 year plan

Goal: Children decode rows of 0s and 1s into a picture, learn the word "pixel", and write the code for a picture.

Length: about 30 minutes.

Materials

- A printed picture zoomed in until its squares show (for example an enlarged printout of a small icon).
- A large 6 by 6 picture grid on the board, with rows numbered 1 to 6 and a code box beside each row.
- Picture grids (6 by 6), two per child, and erasable pencils or one dark crayon.
- Code cards for the boat picture (below), one per pair.
- A tree picture already coloured on a 6 by 6 grid, one per pair, for the main activity.
- Optional, for blind or low-vision children: a raised-line grid with felt squares or counters, and codes in large print or braille.
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

Show a large picture made of squares (an enlarged printout of a small icon). "When a computer shows a picture, the screen is a grid of tiny squares. Each square shows one colour. We call each square a **pixel**." Write "**pi**cture **el**ement" on the board, circle "pi" and "el", and write "pixel" underneath.

"A computer can't keep a picture as crayons. It keeps it as numbers. Today our code is: **0 means leave the square blank, 1 means colour it in.**"

✎ Main activity (17 min)

1. **Teacher models row 1 (3 min).** Write the code 0 0 0 1 0 0 beside row 1 on the board. Point to each number in turn, left to right, and colour the matching square only when the number is 1. (Answer: only square 4 is coloured.)

2. **Pairs decode the mystery picture (8 min).** Give each pair the boat code card. One child reads each number aloud or points to it; the other colours. Swap readers every row. Do not say what the picture is.

Row	Code
1	0 0 0 1 0 0

Row	Code
2	0 0 1 1 0 0
3	0 1 1 1 0 0
4	0 0 0 1 0 0
5	1 1 1 1 1 1
6	0 1 1 1 1 0

(Answer: a sailing boat. Rows 1 to 3 make a triangle sail to the left of the mast, row 4 is the mast, rows 5 and 6 are the boat. Count of coloured squares: 1, 2, 3, 1, 6, 4, so 17 in all.) 3. **Write the code (6 min).** Give each pair the coloured tree picture. Together they write the six row codes in the code boxes. Early finishers swap their codes with another pair and colour a blank grid from the other pair's codes to check.

(Answer for the tree: row 1: 0 0 1 1 0 0; row 2: 0 1 1 1 1 0; row 3: 1 1 1 1 1 1; rows 4, 5 and 6: 0 0 1 1 0 0.)

✓ Discussion questions (with answers) (4 min)

- "What does a 0 tell you? What does a 1 tell you?" (0: leave the square blank. 1: colour it in.)
- "Rows 4, 5 and 6 of the tree have the same code. Why?" (The trunk is the same in each row, so the squares are the same.)
- "If one number in the boat code was wrong, what would happen?" (One square would be wrong in the picture; we could find it by checking each number against each square.)

✓ Closing check (with answers) (4 min)

On the board, draw a single row of six squares and write the code 1 1 0 0 1 1. Children show on their fingers how many squares get coloured, then one child colours them. (Answer: four; squares 1, 2, 5 and 6.)

Then colour squares 3 and 4 of a new row. "Show me the code with number cards, or write it." (Answer: 0 0 1 1 0 0.)

Vocabulary

- **pixel:** one small square of a picture on a screen ("picture element").
- **code:** numbers or symbols that stand for something.
- **row:** a line of squares going across.

Differentiation

- **More support:** use only rows 1 to 4 of the boat, or a 4 by 4 grid; the reader points to each number while the partner colours.
- **More challenge:** children design their own 6 by 6 picture, write its codes and give the codes (not the picture) to a partner.

⚠ Safety

- Usual classroom care with pencils. No screens are needed.

Teacher notes

- Children often read the code right to left, or skip a 0. Ask them to put a finger under each number as they go and move one square across for each number, even when it is 0.
- The idea and the word "pixel" follow CS Unplugged's "Colour by numbers" lesson (see Sources in the unit overview); the boat and tree pictures are the author's own.
- Don't call the rows "binary numbers". At this stage each 0 or 1 is just one square.

Lesson 2: Colour-number keys

Unit overview - Previous: Lesson 1: Picture codes - Next: Lesson 3: Break it down

Back to the grade 2 year plan

Goal: Children use a key to decode a picture made of numbers 0 to 3, change one number and see the picture change, and find out that the same numbers with a different key make a different picture.

Length: about 30 minutes.

Materials

- The large 6 by 6 grid on the board, and key A drawn large beside it.
- Picture grids (6 by 6), two per child.
- Crayons: red, green, blue, and yellow (for key B).
- Key cards A and B, one of each per pair. Each number has its colour word and a coloured dot:
  - **Key A:** 0 = white (leave blank), 1 = red, 2 = green, 3 = blue.
  - **Key B:** 0 = white (leave blank), 1 = yellow, 2 = blue, 3 = green.
- Code cards for the Little Hill picture (below), one per pair.
- Optional, for blind or low-vision children: a raised-line grid, felt squares in different textures for each number, and the key and codes in large print or braille.
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

Recap lesson 1 with one row on the board: 0 1 1 0 0 1. "Last time 0 meant blank and 1 meant coloured. What if we want more colours?" Show key A. "A **key** tells us what each number means. The numbers are the code; the key tells us how to read it."

Model one square: the number 3 means blue, so the teacher colours the square blue **and writes a small 3 in the corner**. "We always write the number in the square, so anyone can check it, even if colours are hard to tell apart."

✎ Main activity (17 min)

1. **Decode Little Hill with key A (9 min).** Pairs take the code card and key A. One reads, one colours; swap readers each row. Each coloured square keeps its small number.

Row	Code
1	3 0 0 3 3 3
2	3 3 3 3 3 3
3	3 3 1 3 3 3

Row	Code
4	3 3 2 2 3 3
5	3 2 2 2 2 3
6	2 2 2 2 2 2

(Answer with key A: a green hill at the bottom, a blue sky, a small white cloud (two blank squares in row 1) and a red flower on top of the hill (row 3, square 3). Counts: 2 white, 1 red, 12 green, 21 blue; 36 squares in all.) 2. **Change one number (3 min).** "Mayor Hen wants a bigger cloud." On the board, change row 1 to 3 0 0 0 3 3. Pairs find the one square that changes on their picture and leave it blank (they can rub out or cover it with a white sticky square). (Answer: row 1, square 4 becomes white; the cloud is now three squares.) 3. **Same numbers, new key (5 min).** Each pair colours rows 4, 5 and 6 again on a fresh grid, using **key B**. Then they put the two pictures side by side. (Answer with key B: the hill turns blue and the sky around it turns green. The numbers did not change; only the key did.)

✓ Discussion questions (with answers) (4 min)

- "The codes were the same. Why do the pictures look different?" (We used a different key, so the same number meant a different colour.)
- "If I send you only the numbers, what else do you need to make my picture?" (The key.)
- "Mayor Hen changed one number. How many squares changed?" (One.)

✓ Closing check (with answers) (4 min)

On the board write the code 1 3 3 and show key A. Children hold up the crayons for the three squares in order. (Answer: red, blue, blue.) Then show key B for the same code. (Answer: yellow, green, green.)

Vocabulary

- **key:** a list that says what each number or symbol means.
- **code:** numbers or symbols that stand for something.
- **pixel:** one small square of a picture (from lesson 1).

Differentiation

- **More support:** use only rows 4 to 6 of the picture with key A; or a key with just two colours.
- **More challenge:** children make their own key C (for example 1 = brown, 2 = yellow, 3 = black) and colour rows 4 to 6 with it, then explain what the picture now looks like.

⚠ Safety

- Usual classroom care with crayons and scissors (if cutting white sticky squares).

Teacher notes

- Keep the small number in each square. It is how children with colour-vision differences check their work, and it shows that the numbers are what is really stored.
- Real screens make colours by mixing red, green and blue light. That is not taught here; keys A and B are made-up keys for a game.
- The Little Hill picture and both keys are the author's own examples, not from a source.

Lesson 3: Break it down

Unit overview - Previous: Lesson 2: Colour-number keys - Next: Lesson 4: Plan before you run

Back to the grade 2 year plan

Goal: Children break a job into small, precise steps in the right order, and see why a vague step doesn't work for a robot.

Length: about 30 minutes.

Materials

- Teacher props for "Duck plants a seed": a paper seed packet with a paper-circle seed inside, a paper pot filled with scrunched brown paper as "soil", and an empty toy watering can.
- The "Duck plants a seed" picture strip (six pictures, no words), one large copy.
- Step cards for "Mouse puts a book back" (five cards, words and a small picture on each), one set per pair.
- Large soft building blocks in three colours (red, blue, green), one of each per pair; blocks too big to swallow.
- Blank step cards (strips of paper) and pencils.
- A book or folder per pair to stand up as a screen.
- Optional, for blind or low-vision children: blocks with different textures or shapes for each colour, and step cards read aloud or in large print or braille.
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

"Today I am a robot. I do **exactly** what you say, and nothing else." Hold up the props and say: "Duck wants to plant a seed. Tell me what to do." Take the first instruction literally. For "Plant the seed!", put the whole closed packet on top of the pot. For "Put it in the pot!", ask "Put what in the pot?" and wait.

"A big job like 'plant a seed' is too big for one step. We need to **break it down** into small steps, in the right order, and each step must be **precise**: it says exactly what to do."

✎ Main activity (17 min)

1. **Duck's steps together (5 min).** Show the six-picture strip. Children say or point to a step for each picture; the teacher writes it on the board and does it, robot-style, with the props:
    1. Open the packet.
    2. Take out one seed.
    3. Make a hole in the soil with one finger.
    4. Put the seed in the hole.
    5. Cover the seed with soil.

6. Water the pot.

(Answer: those six steps, in that order. If children swap steps 4 and 5, the robot covers the hole first and then drops the seed on top; ask "What went wrong?") 2. **Mouse puts a book back (5 min).** Pairs get the five step cards in a muddle and put them in order: 1. Pick up the book. 2. Walk to the shelf. 3. Find the gap where the book goes. 4. Turn the book so its spine faces out. 5. Slide the book into the gap.

(Answer: that order. Steps 3 and 4 can swap and still work; the rest can't. Ask: "Which steps could swap? Which couldn't?") 3. **Tower steps (7 min).** One child is the **planner**, the other the **builder**. The planner secretly decides a tower order (for example red at the bottom, then blue, then green on top) and writes or draws three precise steps on blank cards, such as "Put the red block on the table", "Put the blue block on the red block", "Put the green block on the blue block". The planner sits behind the book screen and passes one card at a time; the builder does exactly what the card says. Then they lift the screen and compare. Swap jobs.

✓ Discussion questions (with answers) (4 min)

- "Why didn't 'Plant the seed!' work for the robot?" (It was too big and not precise; the robot didn't know the small steps.)
- "What happens if the steps are in the wrong order?" (The job can go wrong, like covering the hole before the seed is in.)
- "Was 'Put a block on' a precise step?" (No. Which block, and on what? A precise step names the block and where it goes.)

✓ Closing check (with answers) (4 min)

Read out: "Put the blue block on the table. Put a block on it." Children show a thumbs up if it is precise and thumbs down if not, then say or show how to fix it. (Answer: thumbs down for the second step; for example "Put the red block on the blue block".)

Vocabulary

- **break down (decompose):** split a big job into small steps.
- **precise:** says exactly what to do, with nothing to guess.
- **step:** one small instruction.

Differentiation

- **More support:** the Mouse cards with only four steps (leave out step 3), or a two-block tower.
- **More challenge:** a four-block tower, or a step that uses "repeat" (for example "Repeat 2 times: put a block on top").

⚠ Safety

- Props are paper; no real soil, seeds or water, so there are no allergy or spill risks.

- Blocks are too big to swallow; builders keep towers low (three or four blocks) so nothing falls far.

Teacher notes

- **For the one-to-one check in lesson 5:** give the child the Mouse cards 1, 2, 4 and 5 in a muddle, without card 3. (Answer: order 1, 2, 4, 5, and the missing step is "Find the gap where the book goes", or any step that says where on the shelf the book goes. An order with the turning step anywhere before sliding the book in also counts.)
- Children sometimes think "precise" means "long". A short step can be precise if it names what and where.
- Being the robot is fun because it is silly; keep the literal acting kind, and never use a child's own instructions to make fun of them.
- Duck, Mouse and the steps are the author's own examples.

Lesson 4: Plan before you run

Unit overview - Previous: Lesson 3: Break it down - Next: Lesson 5: Plan, code, swap and check

Back to the grade 2 year plan

Goal: Children fill in a plan (goal, start, steps, what should happen) before running a floor-grid program, then run it and compare what happened with the plan.

Length: about 30 minutes.

Materials

- The 4 by 4 floor grid with the marked front edge, start card, a "Hen's house" card and a toy letter (folded paper), from the grade 1 robot unit.
- Arrow cards (forward, turn left, turn right) and a program strip per group of three.
- Job badges: programmer, tester, bot (one set per group).
- Planning sheets, one per group: boxes for **Goal**, **Start**, **Steps** and **What should happen**, and a box with a tick and a cross for **Did it happen?**
- A large planning sheet on the board.
- Table grids (4 by 4 on paper) with a toy or counter, for groups not on the floor grid.
- Optional, for blind or low-vision children: tactile arrow cards, a raised-edge table grid and planning-sheet boxes with symbol cards.
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

"Duck has a letter for Hen. Before the robot moves, programmers make a **plan**." Fill in the large planning sheet with the class:

- **Goal:** take the letter to Hen's house.
- **Start:** column 1, row 1, facing the back of the grid (show the start card and point).
- **Steps:** (left empty for now).
- **What should happen:** "The robot stops on Hen's house holding the letter."

"Writing what should happen **before** we run the program means we can check it afterwards."

✎ Main activity (17 min)

1. **A plan with a bug (5 min).** Put the start card on (column 1, row 1) and Hen's house on (column 3, row 3). Write these steps on the board plan: forward, forward, turn left, forward, forward. A volunteer bot holds the letter and the tester shows each card. Stop the bot as soon as a step would take it off the grid. "Did it happen?" (Answer: no. After forward, forward the bot is on (column 1, row 3). Turn left points it off the left edge, so the next forward leaves the grid.) "Which step is different from our plan?" (Turn left.) Change it to turn right and run again. (Answer: forward, forward, turn right, forward, forward ends on (column 3, row 3), Hen's house. Tick "Did it happen?")

2. **Groups plan and run (10 min).** Groups of three. Start card on (column 4, row 1), bot facing the back; Hen's house on (column 2, row 4). The group fills in Goal, Start and What should happen **first**, then lays out the steps, then runs. The tester ticks or crosses "Did it happen?". If it is a cross, they find the first step that went wrong, fix it and run again. Swap badges after each run.

   (One answer: forward, forward, forward, turn left, forward, forward. Other answers that reach Hen's house also count, for example turn left, forward, forward, turn right, forward, forward, forward.) 3. **Share (2 min).** One group shows its plan and says whether it matched.

✓ Discussion questions (with answers) (4 min)

- "Why do we write 'what should happen' before we run the program?" (So we can check if the program did what we wanted, and spot a bug.)
- "Two groups had different steps but both reached Hen's house. Were both right?" (Yes. Different programs can reach the same goal.)
- "What do we do if 'Did it happen?' is a cross?" (Find the first step that went wrong, fix it and run again.)

✓ Closing check (with answers) (4 min)

On the board: Goal "reach the star". Start (column 2, row 1), facing the back. Steps: forward, forward. What should happen: "stops on (column 2, row 3)". Show the star on (column 2, row 3). Children show tick or cross for "Will it happen?" (Answer: tick. Two forwards from row 1 reach row 3.)

Vocabulary

- **plan:** what we write before we start: the goal, the steps and what should happen.
- **goal:** what the program is for.
- **bug:** a step that makes the program do something we didn't plan.

Differentiation

- **More support:** routes with no turns (Hen's house straight ahead), and a planning sheet with only Goal and What should happen.
- **More challenge:** add a "puddle" card the robot must not step on, for example on (column 4, row 3) in the group route, and plan a route around it. (One answer: forward, turn left, forward, turn right, forward, forward, turn left, forward. It goes round the puddle and ends on (column 2, row 4).)

⚠ Safety

- The bot walks slowly, one square per card, and nobody else stands on the grid during a run.

- Being the bot is never required; a toy on a table grid counts.

Teacher notes

- "Column" and "row" names are for the adult. Children use the start card, the Hen's house card and pointing.
- A common error is turning **and** stepping on a turn card. Remind children that turn cards turn on the spot with no step, as in grade 1.
- Right and left are from the robot's view. If the bot faces the front edge, the cards look reversed to the class; the "stand behind the robot" trick from grade 1 helps.
- Duck, Hen and the routes are the author's own examples; every route was checked with a small script.

Lesson 5: Plan, code, swap and check

Unit overview - Previous: Lesson 4: Plan before you run

Back to the grade 2 year plan

Goal: Pairs plan a small picture and its code, swap codes with another pair, decode, and compare the result with their plan. The one-to-one check for the unit happens this week.

Length: about 30 minutes, plus about 3 minutes per child for the one-to-one check across the week.

Materials

- Small grids (4 by 4), two per child.
- Picture-plan sheets, one per pair: a box for **Goal** ("Our picture is a ..."), a 4 by 4 grid for **What should happen** (the planned picture), a blank key card, and four row-code boxes.
- Crayons: red, green, blue, yellow; erasable pencils.
- Key cards A and B from lesson 2, for pairs who want to use them.
- For the one-to-one check: a 6-square row strip, number cards 0 to 3, key cards A and B, the "Mouse puts a book back" cards 1, 2, 4 and 5, a finished planning sheet, a table grid and a toy.
- Optional, for blind or low-vision children: raised-line small grids, felt squares, and number cards in large print or braille.
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

Show a finished picture-plan sheet made by the teacher: Goal "a red heart"; key 0 = white, 1 = red; a planned 4 by 4 picture; and the four row codes:

Row	Code
1	1 0 0 1
2	1 1 1 1
3	1 1 1 1
4	0 1 1 0

"We plan the picture **first**, then write the code. Then another pair gets **only the code and the key**. If their picture matches our plan, our code worked."

✎ Main activity (17 min)

1. **Plan and code (8 min).** Each pair writes its goal, makes a key (two or three colours, or uses key A), draws the planned picture on the plan grid, and writes the four row codes. They keep the planned picture hidden (fold the sheet).

2. **Swap and decode (5 min).** Pairs swap only the key and the codes with another pair, who colour a blank small grid, writing the small number in each square.
3. **Compare and fix (4 min).** The decoded grid goes back to the planners, who unfold their plan and compare square by square. If a square doesn't match, together they find out whether the code had a wrong number or the decoder made a slip, and fix it.

✓ Discussion questions (with answers) (4 min)

- "Did the decoded picture match your plan? How did you check?" (Children compare square by square; it matches if every square is the same.)
- "If a square was wrong, how did you find out why?" (Look at the code number for that square: if the number is wrong, the code has a bug; if the number is right, the decoder made a slip.)
- "Why did we draw the plan before writing the code?" (So we know what should happen and can check the result.)

✓ Closing check (with answers) (4 min)

On the board, show the teacher's heart plan and a decoded picture where row 4 is 1 1 1 0. "Does it match?" (Answer: no.) "Which square is different, and what should its number be?" (Answer: row 4, square 1; it should be 0, white.)

The one-to-one check (about 3 minutes each child, across the week)

Use the five parts in the Assessment section of the unit overview. Extra answers for part 5:

- **Plan:** Goal "reach Hen's house". Start (column 1, row 1), facing away from the child. Steps: forward, forward, turn right, forward. What should happen: "stops on Hen's house on (column 2, row 2)".
- **Run:** move the toy one card at a time. (Answer: it stops on (column 2, row 3), one square past Hen's house, so the result did **not** match the plan. A child who also says there is one forward too many before the turn shows extra understanding, but this is not needed for **yes**.)

Record **yes**, **with help** or **not yet** for each part. Don't record which picture or key a child chose.

Vocabulary

- **plan, goal, key, code, pixel, bug** (from lessons 1 to 4).
- **match:** the result is the same as the plan.

Differentiation

- **More support:** two-colour code only (0 and 1), or a 3 by 3 grid; the teacher writes the codes as the child points.
- **More challenge:** a 6 by 6 picture, or a picture that uses a key with four colours; or write the code for a row with a repeat, such as "1 1 1 1" written as "four 1s".

⚠ Safety

- Usual classroom care with pencils and crayons.

Teacher notes

- Children often blame the decoder first. Model checking the code number before deciding who made the slip, and keep it kind: a bug is normal, and finding it is the skill.
- Planned pictures should be things, patterns or shapes, not people in the class.
- The heart picture and the check examples are the author's own; the route was checked with a small script.

Grade 2 Computing: Same Data, Different Pictures (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 11 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Every count, total and comparison in the answer keys was checked with a small computer script, but not with children. No device is needed; if your class does use devices, check logins, accounts and online spaces against your school's rules.
>
> Text-checked by three other agents (Gemini 3.8 Flash, Gemini 4 Carbon and Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 3. Builds on grade 1 Picture charts and keeping information private, grade 2 term 2 Codes and plans, and the bar graph in grade 2 mathematics term 3 Measuring, time, money and shapes (lesson 5).

This unit is "unplugged": cards, squared paper, sticky notes and pretend login cards. No device is needed.

Big idea

Computers keep lots of **data** (facts such as counts and answers). The same data can be shown in different ways: a tally, a table, a picture graph or a bar graph. Each way is good for a different job, and they must all tell the same story. A chart can help us spot a **pattern** and make a **prediction**, which is a careful guess, not a promise. When we work with others online we are kind, helpful and truthful, and we keep our login private and log off when we finish.

Outcomes

By the end of the unit, most children can:

1. Turn a set of picture vote cards (up to four kinds, up to 20 cards) into a tally chart in bundles of five, and then into a table of numbers.
2. Show the same data as a picture graph and as a bar graph with a numbered scale, and read the bar graph to say how many, which is most and fewest, how many altogether and how many more.
3. Say which way of showing the data helps most with a given question, and spot and fix a chart that is not fair (a bar that does not start on the line, squares of different sizes, or missing numbers or labels).
4. Spot a pattern in a bar graph and use it to make a prediction, saying that it is a guess, not a promise.
5. Choose a kind, helpful and true comment for someone's work on a pretend class message board, and say what to do if a message is unkind or asks for private information (do not reply; tell a trusted grown-up).
6. Say that login information is kept private (not shared even with friends), and put the steps for logging off a shared device in order.

Prior knowledge

- From grade 1 computing term 3: sorting picture cards, picture charts with one picture per box, tally marks, a pattern and prediction, what is private, picture passwords and logging off. This unit does **not** re-teach those; it adds a table, a numbered scale, choosing a picture for a question, unfair charts, kind comments online and shared devices.
- From grade 2 mathematics term 3 (lesson 5): a bar graph with up to four categories, one square for each item. From grade 2 science term 3 (lesson 2): reading a class bar graph.
- From grade 2 computing term 2: numbers and symbols can stand for information; a key says what they mean.
- Counting to 20 and reading numbers to 20.

Lessons

Lesson	Title	Time	Core idea
1	From vote cards to a table	30 min	Tally the vote cards in fives, then write the totals in a table.
2	Picture graph and bar graph	30 min	The same numbers as a picture graph and a bar graph with a scale; answering questions.
3	Patterns, predictions and unfair charts	30 min	The umbrella-stand bar graph shows a pattern; three charts that are not fair.
4	Kind and careful online	30 min	A paper "class message board": kind, helpful, true comments; what to do about unkind or nosy messages.
5	Shared devices and logging off	30 min	Duck's story; keeping login cards private; logging off in order; one-to-one check.

The data in this unit

All the data here is made up for this unit (not from a source).

- **Story-time vote (lessons 1, 2, 4 and the check).** The 20 children in Little Hill School's class each chose one book for story time, with no names on the cards: Duck's Picnic 6, Bear's Picnic 4, Goat and the Kite 7, Hen's Hat 3 (20 altogether). Each vote card shows the book's animal and the first letter of its title.
- **Umbrella stand (lesson 3).** The number of umbrellas in the Little Hill School umbrella stand at 9 o'clock each school day for two weeks, with a weather symbol under each day: week 1: Monday sunny 2, Tuesday rainy 9, Wednesday sunny 1, Thursday rainy 8, Friday cloudy 4; week 2: Monday rainy 9, Tuesday sunny 2, Wednesday cloudy 4, Thursday sunny 1, Friday rainy 10.
- **Bar graphs** stand up from a **start line**, use squares all the same size (2 cm squared paper), have a label under each bar and a **scale** of numbers up the left side (0 at the start line, then 1, 2, 3 and so on, one number for each square).

Materials

Whole class unless noted.

- Story-time vote cards (20 picture cards, the counts above), one set per pair, plus one large set for the board.

- Tally sheets with four rows (one per book, with the animal picture), one per pair; table sheets with two columns (Book, Number), one per pair; large copies of both for the board.
- Squared paper (2 cm squares) with a start line and a 0 to 10 scale printed up the left side, two sheets per child; small picture stickers or drawn pictures for the picture graph; card squares and glue for raised bars.
- Crayons, erasable pencils and a ruler per pair; small whiteboards and pens (or paper); craft sticks for tallies; counters (about 10 per pair).
- The umbrella-stand bar graph (lesson 3), one per pair and one large copy, with weather symbols under each bar.
- Three "Is it fair?" chart cards (lesson 3), one set per pair, and an "a lot" card and an "a few" card per pair.
- Question cards for lessons 2 and 3 (printed in the lesson answer keys).
- Lesson 4: a large paper "class message board" (a sheet of card with a title box), sticky notes, comment cards (printed in lesson 4), sentence-starter strips and picture symbols, and the "Stop, think, tell" poster.
- Lesson 5: a pretend tablet made of card (a screen with a "Log in" box, a "Log off" button and an "Are you sure?" box), Duck's story cards, a sheet of ten small pictures per child and blank small cards, pretend picture-login cards (one per child, in an envelope with the child's name on the outside only), and log-off step cards.
- For the one-to-one check: a bag of 8 counters (or 8 vote cards), a pencil and paper for tallies, the check bar graph, two small tables, the umbrella-stand bar graph, and comment and login choice cards (printed in lesson 5).
- Optional, for blind or low-vision children: tallies made with craft sticks laid on felt, raised bar graphs with card squares and a raised start line, vote cards with a different texture for each book, and cards and tables in large print or braille.
- Ear defenders and a quiet spot.

⚠ Safety and access

- **No names on data.** Votes are anonymous; nobody has to say which book they chose. The umbrella data is made up, and no child's belongings are counted.
- **Private stays private.** Children never say, write or show a real password, and are never asked for one. The login cards in lesson 5 are pretend, made in class, and go home or in the bin at the end.
- **Online feelings are handled gently.** Lesson 4 uses made-up messages about made-up characters. Children are never asked whether anyone has been unkind to them online. If a child tells you something worrying, follow your school's safeguarding procedure.
- **Colour is never the only clue.** Bars carry labels and the animal picture, not only a colour. The weather symbols use shapes (sun, cloud, raindrops) and the word.
- **Speaking is optional.** Children can answer by pointing, placing cards or counters, a tick card or their usual communication system.
- **Blind or low-vision children:** raised bars, craft-stick tallies and textured vote cards; the child counts squares or sticks by touch and reads the scale by feeling the raised start line and counting up.
- **Deaf or hard-of-hearing children:** every question is on a card or the board; the teacher points while reading.
- **Fine motor:** a child can stick card squares, place counters or point while a partner draws. Neat drawing is never assessed.

Assessment

Lesson 5 ends with a short one-to-one check (about 3 to 4 minutes each child; spread over the week). Record each part as **yes**, **with help** or **not yet**:

1. **Tally** (outcome 1): the child counts 8 counters and makes a tally. (Answer: one bundle of five and three more lines.)
2. **Read a bar graph with a scale** (outcome 2): the check bar graph shows the story-time vote (Duck's Picnic 6, Bear's Picnic 4, Goat and the Kite 7, Hen's Hat 3). "Which book got the most votes?" (Goat and the Kite.) "How many more votes did Goat and the Kite get than Bear's Picnic?" (3.)
3. **Same data** (outcome 2): two small tables are shown next to the check bar graph. Table 1: 6, 4, 7, 3. Table 2: 6, 7, 4, 3. "Which table tells the same story as the bar graph?" (Table 1.)
4. **Which picture, and is it fair?** (outcome 3): "I want to compare the books quickly. Which helps more, the table or the bar graph?" (The bar graph; a child who says the table is good for finding an exact number also shows the idea.) Then show "Is it fair?" chart card 1 (lesson 3). "What is wrong?" (Hen's bar does not start on the line.)
5. **Pattern** (outcome 4): on the umbrella-stand bar graph: "The forecast says next Monday will be rainy. Will there be a lot of umbrellas or a few?" (A lot; yes if the child points to the rainy days or says rainy days have the most. A child who adds "but it's a guess" shows the whole idea.)
6. **Online and logins** (outcomes 5 and 6): comment choice card A and login choice card B (printed in lesson 5). (Answers in lesson 5.)

Doing it in their own way counts as **yes**. "Not yet" is normal for some children; data and online safety return in grade 3.

Sources

- Computer Science Teachers Association, CSTA K-12 Computer Science Standards (2017), progression chart: https://csteachers.org/wp-content/uploads/2025/06/2017-csta-k-12-standards-progression-chart.pdf (read 10 November 2026). Level 1A (ages 5-7) lines, quoted exactly; the unit is not a full alignment:
    - 1A-DA-06: "Collect and present the same data in various visual formats." (lessons 1, 2 and 3)
    - 1A-DA-07: "Identify and describe patterns in data visualizations, such as charts or graphs, to make predictions." (lesson 3)
    - 1A-IC-17: "Work respectfully and responsibly with others online." (lesson 4, on paper)
    - 1A-IC-18: "Keep login information private, and log off of devices appropriately." (lesson 5, on a pretend device)
- Common Core State Standards for Mathematics, grade 2, Measurement and Data, 2.MD.D.10: "Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph." https://web.archive.org/web/2025/https://www.thecorestandards.org/Math/Content/2/MD/ (read 10 November 2026; a footnote marker after "problems" is left out). This is why every graph here has up to four bars and one square for each item.

Known gaps and cautions

- Three other agents (Gemini 3.8 Flash, Gemini 4 Carbon and Gemini 4 Argon, all at 11a3d2a) text-checked this unit on 2026-11-11 and reported no errors; Carbon suggested one optional wording fix in lesson 1, made in 6897a8c and re-checked by Argon. Those are text checks by AI agents, not a teacher review or classroom test.
- **The data, stories, comment cards, chart cards and pretend tablet are the author's own examples**, not from a source.
- **CSTA 1A-DA-06, 1A-DA-07 and 1A-IC-18 were also used in the grade 1 term 3 unit.** This unit repeats them a step harder (a table, a numbered scale, four categories, unfair charts, shared devices); it has not been checked against any published grade 2 computing scheme.
- **"Online" is on paper.** Lesson 4's message board and lesson 5's tablet are pretend. Children who use real devices at school will need the school's own rules taught as well.
- **Lesson 3's umbrella pattern is a comparison, not proof** that rain causes umbrellas; the lesson says so in child-friendly words, and treats predictions as guesses.
- **Mathematics overlap.** Grade 2 mathematics term 3 lesson 5 also makes a bar graph. This unit adds the numbered scale, the table and the "same data" idea; if the classes are close together, lesson 2 can be shortened.
- **Other level 1A lines** (for example 1A-DA-05 storing and finding data on a device, and 1A-NI-04 strong passwords) are not taught here.

Lesson 1: From vote cards to a table

Unit overview - Next: Lesson 2: Picture graph and bar graph

Back to the grade 2 year plan

Goal: Children sort 20 picture vote cards, make a tally chart in bundles of five, and write the totals in a table.

Length: about 30 minutes.

Materials

- Story-time vote cards (20 picture cards: Duck's Picnic 6, Bear's Picnic 4, Goat and the Kite 7, Hen's Hat 3), one set per pair, plus one large set for the board.
- Tally sheets with four rows (one per book, with the animal picture), one per pair, and a large copy for the board.
- Table sheets with two columns (Book, Number), one per pair, and a large copy for the board.
- Erasable pencils, and small whiteboards and pens (or paper) for the closing check.
- Craft sticks (about 10 per child who wants them) for laying tallies.
- Optional, for blind or low-vision children: craft sticks and a felt mat for tallies, textured vote cards, and tally and table sheets in large print or braille.
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

"Little Hill School's class voted for a story-time book. Each child put one card in a box, with no names. Here are the cards. Computers keep facts like these. Facts we collect are called **data**."

Hold up the four books' cards. "Lots of cards in a muddle are hard to read. This week we will show the **same data** in different ways, and see what each way is good for."

✎ Main activity (17 min)

1. **Teacher models a tally (4 min).** Turn over the first eight board cards one at a time. For each card, draw one line in that book's row. When a row gets its fifth mark, draw it across the other four: "Five makes a bundle. Bundles are quick to count." (Answer for the first eight board cards, laid in this order: Goat, Duck, Goat, Hen, Goat, Bear, Goat, Goat: Goat has one bundle of five; Duck, Hen and Bear have one line each.)

2. **Pairs tally all 20 cards (8 min).** Each pair shuffles its set. One child turns over a card and says or shows the book; the other draws the line. Swap jobs after 10 cards. Then pairs count each row by bundles and lines.

(Answer: Duck's Picnic: one bundle and 1 line, 6. Bear's Picnic: 4 lines, 4. Goat and the Kite: one bundle and 2 lines, 7. Hen's Hat: 3 lines, 3.) 3. **Tally to table (5 min).** Pairs write each total in the Number column of the table. Then they add a last row, "Altogether", and work it out. (Answer: 6, 4, 7, 3; altogether 20.) Early finishers check: "Do we have 20 cards? Does the table say 20?"

✓ Discussion questions (with answers) (4 min)

- "The cards, the tally and the table all show the same data. How do we know?" (They all say Duck's Picnic 6, Bear's Picnic 4, Goat and the Kite 7, Hen's Hat 3, and 20 altogether.)
- "Which is quickest for finding how many voted for Hen's Hat?" (The table: the number is written there. In the tally you count the lines; with the cards you count them all.)
- "Why do we draw a bundle of five?" (Bundles are quicker to count than lots of single lines.)

✓ Closing check (with answers) (4 min)

Show a tally row on the board: one bundle and 4 lines. "Show me how many with your fingers or number cards." (Answer: 9.)

Then: "Draw a tally for 7." Children draw on whiteboards or lay craft sticks. (Answer: one bundle of five and 2 lines.)

Vocabulary

- **data:** facts we collect, such as counts or answers.
- **tally:** a line for each thing counted, in bundles of five.
- **table:** rows and columns with words and numbers.
- **altogether:** all of them added up.

Differentiation

- **More support:** use only three books (leave out Hen's Hat, 17 cards) and give tally sheets with two rows of five dotted boxes for each book, one line in each box (Goat and the Kite needs 7 boxes).
- **More challenge:** "How many more voted for Goat and the Kite than for Duck's Picnic?" (1.) Then pairs make up a fifth book, give it some votes, and change the table and the Altogether row.

⚠ Safety

- Usual classroom care with pencils. No screens are needed. Nobody says which book they would choose; the votes are Little Hill's.

Teacher notes

- Children sometimes draw the fifth line as a separate line, or draw it across after six. Count aloud "one, two, three, four, and five goes across".
- Some children count a bundle as 4, because they count the four upright lines. Ask them to touch every line, including the one across.
- Children who tallied with craft sticks can leave their tally on the mat for lesson 2, or use the board table.
- The vote cards and books are the author's own examples; "Duck's Picnic", "Bear's Picnic" and "Goat and the Kite" are stories from earlier units, and "Hen's Hat" is just a title on a card.

Lesson 2: Picture graph and bar graph

Unit overview - Previous: Lesson 1: From vote cards to a table - Next: Lesson 3: Patterns, predictions and unfair charts

Back to the grade 2 year plan

Goal: Children show the story-time votes as a picture graph and as a bar graph with a numbered scale, check that both tell the same story as the table, and answer questions from the bar graph.

Length: about 30 minutes.

Materials

- The class table from lesson 1 (Duck's Picnic 6, Bear's Picnic 4, Goat and the Kite 7, Hen's Hat 3) on the board, and each pair's own table.
- Squared paper (2 cm squares) with a start line and a 0 to 10 scale printed up the left side, two sheets per child.
- Small picture stickers or drawn pictures for the picture graph.
- Card squares and glue for raised bars (for any child who wants them).
- Crayons, erasable pencils and a ruler per pair.
- Question cards (below), one set per pair.
- Optional, for blind or low-vision children: a raised start line, card squares in a different texture for each bar, and the scale and question cards in large print or braille.
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

Point to the table. "Yesterday we made a table. Today we'll draw the **same data** as pictures." Show a large sheet with a start line. "Every bar starts on this **start line**. The squares are all the same size. And up the side is a **scale**: the numbers tell us how tall a bar is without counting every square."

Model one bar: Duck's Picnic, 6 squares coloured up from the start line. Run a finger from the top of the bar across to the scale. "The top of the bar is level with 6. Duck's Picnic got 6 votes."

✎ Main activity (17 min)

1. **Picture graph (5 min).** On the first sheet, each child sticks or draws one picture in each square, starting at the start line, one column for each book. They write the book's animal or first letter under each column. (Answer: columns of 6, 4, 7 and 3 pictures.)
2. **Bar graph (6 min).** On the second sheet, children colour (or stick card squares for) one bar per book, starting at the start line, then write the label under each bar. They check the top of each bar against the scale. (Answer: bar tops level with 6, 4, 7 and 3.)

3. **Question cards (6 min).** Pairs answer from their bar graph, using the scale where they can:

Card	Question	Answer
1	Which book got the most votes?	Goat and the Kite (7)
2	Which book got the fewest votes?	Hen's Hat (3)
3	How many votes did Bear's Picnic get?	4
4	How many more votes did Goat and the Kite get than Bear's Picnic?	3 (7 take away 4)
5	How many votes did Duck's Picnic and Bear's Picnic get together?	10 (6 and 4)
6	How many children voted altogether?	20 (6 + 4 + 7 + 3)

Early finishers try card 7: "If 2 more children voted for Hen's Hat, which books would it be level with?" (None: Hen's Hat would have 5, and no other book has 5. It would be one more than Bear's Picnic and one fewer than Duck's Picnic.)

✓ Discussion questions (with answers) (4 min)

- "Do the table, the picture graph and the bar graph tell the same story?" (Yes: 6, 4, 7 and 3 in each.)
- "Which helps you see the biggest and smallest fastest?" (The picture graph or the bar graph: you can see the tallest and shortest without reading numbers.)
- "How does the scale help?" (You read the number level with the top of the bar instead of counting every square.)
- "Why must every bar start on the start line?" (So the bars can be compared fairly; a bar that starts higher would look bigger than it is.)

✓ Closing check (with answers) (4 min)

Draw a bar on the board, 5 squares tall, next to the scale. "How many does this bar show? Show me." (Answer: 5.)

Then: "Goat and the Kite has 7. Hen's Hat has 3. Show me how many more Goat and the Kite has." (Answer: 4.)

Vocabulary

- **picture graph:** a chart with one picture for each thing counted.
- **bar graph:** a chart where the height of each bar shows how many.
- **scale:** the numbers up the side of a bar graph.
- **start line:** the line every bar starts from.

Differentiation

- **More support:** stick card squares and count them; use cards 1 to 3 only.

- **More challenge:** draw the same bar graph sideways, with the bars going across from a start line on the left and the scale along the bottom. Does it tell the same story? (Yes.)

⚠ Safety

- Usual classroom care with glue and scissors (if cutting card squares, use round-ended scissors). No screens are needed.

Teacher notes

- Children often read the scale number just above or below the top of the bar, or count the start line as 1. Model running a ruler from the top edge of the bar across to the scale.
- Some children colour bars different widths or leave gaps inside a bar. Point out that each square is one vote, so every square must be the same size and next to the last one.
- Grade 2 mathematics term 3 lesson 5 made bar graphs by counting squares. The new step here is reading the numbered scale and comparing the bar graph with the table and picture graph.

Lesson 3: Patterns, predictions and unfair charts

Unit overview - Previous: Lesson 2: Picture graph and bar graph - Next: Lesson 4: Kind and careful online

Back to the grade 2 year plan

Goal: Children read a bar graph with ten bars, spot a pattern, make a prediction and say it is a guess; then they find and fix three charts that are not fair.

Length: about 30 minutes.

Materials

- The umbrella-stand bar graph, one per pair and one large copy for the board: ten bars (two weeks of school days), a 0 to 10 scale, and a weather symbol and word under each bar (week 1: Monday sunny 2, Tuesday rainy 9, Wednesday sunny 1, Thursday rainy 8, Friday cloudy 4; week 2: Monday rainy 9, Tuesday sunny 2, Wednesday cloudy 4, Thursday sunny 1, Friday rainy 10).
- Three "Is it fair?" chart cards (below), one set per pair, and large copies for the board.
- The class table from lesson 1 (Duck's Picnic 6, Bear's Picnic 4, Goat and the Kite 7, Hen's Hat 3).
- Squared paper with a start line and scale, one sheet per pair, and crayons, pencils and a ruler.
- Counters (about 10 per pair) and an "a lot" card and an "a few" card per pair.
- Optional, for blind or low-vision children: raised versions of the umbrella graph and the chart cards (card squares, raised start line, tactile weather symbols), and everything in large print or braille.
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

Show the large umbrella-stand bar graph. "Every school day at 9 o'clock, Mouse counted the umbrellas in the Little Hill School umbrella stand, for two weeks. Under each bar is the weather that morning." Read the symbols together: sun, cloud, raindrops.

"Look at the tall bars. Look at the short bars. What do you notice?"

✎ Main activity (17 min)

1. **Find the pattern (6 min).** Pairs put a counter on every rainy day, then every sunny day, then every cloudy day, and read each bar with the scale.

   (Answer: rainy days: 9, 8, 9 and 10, the tallest bars. Sunny days: 2, 1, 2 and 1, the shortest bars. Cloudy days: 4 and 4, in the middle. The pattern: on rainy days there are

lots of umbrellas; on sunny days only a few.) 2. **Make a prediction (3 min).** "The forecast says next Monday will be rainy. Will there be a lot of umbrellas or a few?" Pairs show "a lot" or "a few" with a card, then say why. (Answer: a lot, probably about 8 to 10, because every rainy day so far had 8 to 10.) Then: "Is it certain?" (No. It is a guess from the pattern. Some children might forget their umbrella, or the rain might stop early.) 3. **Is it fair? (8 min).** Give each pair the three chart cards. Each one shows the story-time votes from lesson 1, but something is wrong. Pairs compare each card with the table, say what is wrong, and draw one fixed chart on squared paper.

Card	What it shows	What is wrong (answer)
1	Hen's Hat's bar is 3 squares tall but starts 4 squares above the start line, so its top is level with 7, the same as Goat and the Kite.	The bar does not start on the start line. Hen's Hat looks as big as Goat and the Kite, but it has 3, not 7.
2	Goat and the Kite's bar has 7 squares, but they are half the height of the others, so it looks shorter than Duck's Picnic's 6.	The squares are not all the same size. Goat and the Kite got the most votes but looks smaller.
3	Four bars of the right heights, but no scale numbers and no labels under the bars.	You can't tell which bar is which book, or how many each has without counting. It needs labels and a scale.

✓ Discussion questions (with answers) (4 min)

- "What pattern did you find in the umbrella graph?" (Rainy days have lots of umbrellas; sunny days have a few.)
- "Does the graph prove that rain makes people bring umbrellas?" (Not by itself: it shows they happen together on these ten days. But it helps us make a good guess.)
- "Why might someone make an unfair chart by mistake?" (They might start a bar in the wrong place, draw squares different sizes, or forget the labels.)
- "How can we check a chart is fair?" (Every bar starts on the start line, the squares are all the same size, every bar has a label, and there is a scale.)

✓ Closing check (with answers) (4 min)

On the umbrella graph, point to week 2 Thursday. "What was the weather, and how many umbrellas?" (Answer: sunny, 1.)

Then show chart card 1 again. "Thumbs up if it is fair, thumbs down if not." (Answer: thumbs down; Hen's bar does not start on the line.)

Vocabulary

- **pattern:** something that happens again and again.
- **prediction:** a careful guess about what will happen, using a pattern.
- **fair (chart):** a chart that shows the numbers truly, so the bars can be compared.

Differentiation

- **More support:** use only week 1 (five bars) and only chart card 1.

- **More challenge:** "Mouse counted for a third week. Which days do you think will be tallest?" (Children cannot know without the weather; the best answer is "the rainy days, whichever they are".) Then make a fourth unfair chart for a partner to fix.

⚠ Safety

- Usual classroom care with pencils. No screens are needed. The umbrella data is made up; no child's belongings are counted.

Teacher notes

- Some children think a prediction must be right. Say often: "A prediction is a careful guess. If it turns out wrong, we learn something."
- Some children read week 2 Friday (10) as off the scale. Show that the scale goes up to 10.
- Card 1 is the hardest; children often say "Hen's Hat has 7". Ask them to count the squares in the bar, not where the top is.
- The umbrella data and chart cards are the author's own examples, not from a source.

Lesson 4: Kind and careful online

Unit overview - Previous: Lesson 3: Patterns, predictions and unfair charts - Next: Lesson 5: Shared devices and logging off

Back to the grade 2 year plan

Goal: Children practise kind, helpful and true comments on a pretend class message board, and say what to do if a message is unkind or asks for private information.

Length: about 30 minutes.

Materials

- A large paper "class message board": a sheet of card with the title "Little Hill class board" in a box at the top, and the children's bar graphs from lesson 2 pinned around it (only if each child agrees; a child can pin a copy of the board bar graph instead).
- Sticky notes, several per child, and pencils.
- Printed sentence-starter strips ("I like how…", "Your bars…", "Could you add…?") and picture symbols.
- Comment cards (below), one set per pair, and large copies for the board.
- The "Stop, think, tell" poster: **Stop** (don't reply straight away), **Think** (is it kind? is it private?), **Tell** (a trusted grown-up).
- Optional, for blind or low-vision children: comment cards in large print or braille, read aloud; sticky notes with a raised dot in the corner so the child knows which way up.
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

"Lots of people use computers to work together: they share pictures and leave messages for each other. That's being **online**. Today our class board is a pretend online board, made of paper."

"Goat put a bar graph on the Little Hill class board. Three friends left messages." Read the first three comment cards. "Which one would help Goat? Which one might make Goat sad?"

✎ Main activity (17 min)

1. **Sort the comments (7 min).** Pairs sort the comment cards into two piles: "Kind and helpful" and "Not OK". Then they pick one "Not OK" card and say what to do.

Card	Message (for Goat's bar graph)	Answer
1	"Your bars all start on the line. Well done!"	Kind and helpful: it is true and says what is good.
2	"Your graph is rubbish."	Not OK: unkind, and it doesn't help. Don't reply; tell a grown-up if it upsets you.

Card	Message (for Goat's bar graph)	Answer
3	"I think Hen's Hat needs a label."	Kind and helpful: it is polite and helps Goat fix the chart.
4	"LOL" with a laughing face, posted by someone Goat doesn't know.	Not OK: it might be laughing at Goat, and we don't know who it is. Stop, think, tell a grown-up.
5	"Nice graph! What's your password so I can fix it for you?"	Not OK: it asks for private information. Never share a password; tell a grown-up.
6	"I counted your Duck bar. I think it has 7 squares, not 6. Can you check?"	Kind and helpful: it is polite, and asks Goat to check instead of saying "wrong".
7	"Where do you live? I want to send you a better graph."	Not OK: it asks where Goat lives, which is private. Stop, think, tell a grown-up.

(Kind and helpful: cards 1, 3 and 6. Not OK: cards 2, 4, 5 and 7.) 2. **Write a comment (7 min).** Each child chooses one bar graph on the class board (not their own) and writes or draws a sticky-note comment that is **kind, helpful and true**: one thing that is good, and, if they like, one polite idea to make it better. Children who prefer can choose a printed starter: "I like how…", "Your bars…", "Could you add…?" 3. **Read your board (3 min).** Children read the comments on their own graph (or have them read aloud). "Did any comment help you?"

✓ Discussion questions (with answers) (4 min)

- "What makes a comment kind and helpful?" (It is polite, true, and says what is good or how to make it better.)
- "What should you do if a message is unkind?" (Don't reply; tell a trusted grown-up.)
- "What should you do if a message asks for a password or where you live?" (Don't answer; stop, think and tell a trusted grown-up.)
- "Online messages can stay for a long time and lots of people can see them. How does that change what we write?" (We think before we post and only write things we'd be happy for anyone to read.)

✓ Closing check (with answers) (4 min)

Read two new messages. Children show thumbs up for "kind and helpful" and thumbs down for "not OK".

- "Your scale numbers are neat. Could you add a label under the last bar?" (Answer: thumbs up.)
- "Tell me your login and I'll give you a sticker." (Answer: thumbs down; it asks for private information.)

Vocabulary

- **online:** using computers to share and talk with other people.
- **comment:** a message about someone's work.
- **respectful:** kind and polite, treating others well.

- **private:** something we keep to ourselves and trusted grown-ups.

Differentiation

- **More support:** use cards 1, 2, 3 and 5 only; offer sentence starters and picture symbols for the sticky notes.
- **More challenge:** rewrite card 2 so it is kind and helpful. (For example: "Your bars are colourful. Could you make all the squares the same size?")

⚠ Safety

- The messages are about made-up characters. Children are never asked whether anyone has been unkind to them online, or what apps or games they use.
- A child can choose not to pin their own graph. Remove any sticky note that is unkind before children read their boards.
- If a child tells you something worrying, follow your school's safeguarding procedure.

Teacher notes

- Some children think a helpful comment must never suggest a change. Show that card 6 is kind and still points out something to check.
- Some children say "I'd reply and tell them off". Praise the wish to stand up for themselves, then explain that telling a grown-up is safer and works better.
- "Stop, think, tell" is the author's own wording, not from a source. If your school uses a different phrase for online safety, use that instead.
- The comment cards are the author's own examples, not from a source.

Lesson 5: Shared devices and logging off

Unit overview - Previous: Lesson 4: Kind and careful online

Back to the grade 2 year plan

Goal: Children say why login information stays private, even from friends, and put the steps for logging off a shared device in order. The one-to-one check takes place this week.

Length: about 30 minutes, plus the one-to-one check (about 3 to 4 minutes each child, spread over the week).

Materials

- A pretend tablet made of card: a screen with a "Log in" box, a "Log off" button and an "Are you sure?" box with "Yes" and "No".
- Duck's story cards (below), large, for the board.
- A sheet of ten small pictures per child, blank small cards, and crayons or pencils.
- Pretend picture-login cards: one per child, made in this lesson (three small pictures chosen from a sheet of ten, in a row), each in an envelope with the child's name on the outside only.
- Log-off step cards (below), one set per pair.
- For the one-to-one check: a bag of 8 counters (or 8 vote cards), a pencil and paper, the check bar graph (the story-time votes), two small tables (table 1: 6, 4, 7, 3; table 2: 6, 7, 4, 3), "Is it fair?" chart card 1 (lesson 3), the umbrella-stand bar graph (lesson 3), and choice cards A and B (below).
- Optional, for blind or low-vision children: a tablet with a raised "Log off" button, tactile picture choices for the login card, and story and step cards in large print or braille.
- Ear defenders and a quiet spot.

Steps

✎ Opening (5 min)

Tell Duck's story with the cards.

1. Duck uses the class tablet to make a bar graph, and logs in with Duck's picture login.
2. The bell rings. Duck runs out to play and leaves the tablet on, still logged in.
3. Crab picks up the tablet. It still says "Duck". Crab posts "I don't like Goat's graph" on the class board. Everyone thinks Duck wrote it.
4. Goat is sad. Duck is upset: "I didn't write that!"

"What went wrong? How could Duck have stopped it?" (Duck didn't log off, so the tablet still said Duck. Crab should not have posted as Duck; it wasn't fair or kind.)

✎ Main activity (17 min)

1. **Make a pretend login card (5 min).** Each child picks three pictures from the sheet and draws them in a row on a small card. "This is a **pretend** login. A real one would be

kept just as secret." The card goes straight into the envelope. "Who can see it?" (Only me and a trusted grown-up, such as my teacher or family.)

2. **Friends and logins (4 min).** Ask, with thumbs up or down:
    - "Your best friend asks for your login so they can play your game. Do you share it?" (Thumbs down: logins stay private even from friends. A friend could post as you by mistake, or share it with someone else.)
    - "Your teacher helps you log in when you forget." (Thumbs up: a trusted grown-up can help.)
    - "A message on the screen says 'Type your password to win a prize'." (Thumbs down: stop, think, tell a grown-up.)

3. **Log-off steps (8 min).** Pairs put the log-off step cards in order, then act them out on the card tablet: one child is the user, the other the checker who watches each step.

Card	Step (cards are given in a muddle)
A	Save your work.
B	Press "Log off".
C	When it asks "Are you sure?", press "Yes".
D	Check the screen says "Log in" again, not your name.
E	Put the tablet back where it lives.

(Answer: A, B, C, D, E. A, B and C must be in that order; a child who swaps D and E but checks the screen before walking away also shows the idea.)

"What if you forget and see a friend's name on a shared tablet?" (Don't use it as them; log them off or tell a grown-up.)

✓ Discussion questions (with answers) (4 min)

- "Why do we keep our login private, even from friends?" (So nobody else can post or change things as us.)
- "Why do we log off a shared tablet?" (So the next person can't use it as us.)
- "Who can help if we forget our login?" (A trusted grown-up, such as the teacher.)
- "What would have helped in Duck's story?" (Duck logging off; Crab not posting as Duck; Crab telling a grown-up the tablet was still logged in.)

✓ Closing check (with answers) (4 min)

Hold up step card B ("Press 'Log off'"). "Which card comes just before this one?" (Answer: A, save your work.) "Which comes just after?" (Answer: C, press "Yes".)

Then collect the login envelopes. They go home, or into the bin, today; nobody opens anyone else's.

The one-to-one check

Use the six parts in the unit overview (see Assessment there). The cards for part 6:

- **Choice card A (online):** "Goat's graph is on the class board. Which message would you leave?" Pictures with words: (1) "Your graph is silly." (2) "I like your scale. Could you add a label?" (3) "What's your password?" (Answer: 2. **Yes** if the child also says that 3 asks for private information, or that they would tell a grown-up about 1 or 3.)
- **Choice card B (logins):** "You've finished on the class tablet. What do you do?" Pictures with words: (1) Walk away. (2) Save, press "Log off", press "Yes", check it says "Log in". (3) Give your login to a friend so they can carry on. (Answer: 2.)

Vocabulary

- **login:** the name and secret (such as a password or picture code) that tells a computer who you are.
- **log off:** tell the computer you have finished, so nobody else can use it as you.
- **shared device:** a computer or tablet that lots of people use.
- **trusted grown-up:** an adult you know who keeps you safe, like your teacher or family.

Differentiation

- **More support:** use step cards A, B and C only; act out the steps with an adult first.
- **More challenge:** "Write one rule for the class tablet that would have stopped Duck's problem." (For example: "Always log off before you go.") Then put it on the class board.

⚠ Safety

- The login cards are pretend and are never used for anything. Children never say, write or show a real password, and are never asked for one.
- If your class uses real devices, teach your school's own login and log-off steps; they may differ from the cards here.
- Crab's message is about a made-up character. Children are not asked about anything that has happened to them online.

Teacher notes

- Some children think it's fine to share a login with a best friend. Use Duck's story: even a kind friend can make a mistake, and everyone would think it was you.
- Some children think closing the lid is logging off. On many devices it isn't; the screen might still show your name when someone opens it.
- Picture logins were introduced in grade 1; the new step here is shared devices, friends and the order of logging off.
- Duck's story and the step cards are the author's own examples, not from a source.

Unit: Inputs, Outputs, Loops, and Debugging (Computing, Grade 3)

> **Unreviewed AI draft.** Written by Gemini 4 Argon (2026-11-04). No human teacher has reviewed this unit. All content is CC0 1.0 Public Domain.

Overview

Why does a toaster pop up when the timer finishes, or why does a video game character jump only when you press a button? Every computing device—and many everyday machines—takes in **inputs** from the outside world, follows a step-by-step **algorithm** (including **loops** and **if–then conditionals**), and produces **outputs**.

Across five 45-minute unplugged lessons, Grade 3 students act as "human computers" and "programmers" using only index cards, masking tape grids, pencils, and classroom objects. Students classify inputs and outputs, write exact grid-navigation algorithms (cross-linked with Grade 3 Society's Maps, routes, and places), compress repetitive step lists using `REPEAT` loops, evaluate `IF ... THEN ... ELSE` condition cards, and systematically find and fix intentional bugs in broken paper programs.

Prior knowledge

- Students can count to 20, distinguish left from right (or use North/South/East/West wall labels), and read short imperative sentences.
- Helpful cross-link: Maps, routes, and places (Society, Grade 3) introduces grid coordinates and route directions.
- Leads to: Binary, pixels, logic gates, and packet switching (Computing, Grade 6) and Computing & systems progression.

Learning goals

By the end of this unit, a student can:

1. Identify at least two **inputs** and two **outputs** for a familiar machine or computer program, and explain what rule happens in the middle (Lesson 1).
2. Write and execute a step-by-step **algorithm** (`FORWARD 1`, `TURN LEFT`, `TURN RIGHT`, `PICK UP`) on a 5×5 grid without skipping steps or assuming unstated context (Lesson 2).
3. Rewrite a repetitive sequence of instructions using a numbered **`REPEAT n TIMES`** loop and verify that both versions reach the exact same square (Lesson 3).
4. Trace an algorithm containing **`IF ... THEN ... ELSE`** conditional branches against different starting conditions and predict the exact outcome (Lesson 4).
5. Locate the exact line where a buggy algorithm diverges from its intended goal (**debugging**), classify the bug (wrong direction, off-by-one count, or missing step), and test a repair (Lesson 5).

Lesson sequence

Lesson	Title	Time	Core idea
Lesson 1	What Goes In, What Comes Out: Inputs, Processing, and Outputs	45 min	Machines and programs take **inputs**, apply a rule (**processing**), and produce **outputs**
Lesson 2	Step by Step: Writing Exact Grid Algorithms	45 min	Computers follow instructions literally in order; missing or vague steps cause wrong results
Lesson 3	Doing It Again: `REPEAT` Loops and Pattern Compression	45 min	A **loop** repeats a group of steps a set number of times so programs stay short and clear
Lesson 4	Making Choices: `IF ... THEN ... ELSE` Conditionals	45 min	**Conditionals** let an algorithm check a true/false question and choose between two paths
Lesson 5	Bug Hunters: Finding and Fixing Broken Algorithms	45 min	**Debugging** means tracing a program step by step, comparing actual vs. expected state, and fixing the fault

Materials for the whole unit

No computers or tablets are required. Everything runs unplugged:

- Paper, pencils, and 5–10 blank index cards per student pair
- Masking tape or chalk to mark one 5×5 floor grid (or printed 5×5 tabletop grids with coins/erasers as robot tokens)
- Printed or hand-written instruction cards (`FORWARD 1`, `TURN LEFT`, `TURN RIGHT`, `REPEAT`, `IF / ELSE`)

Assessment summary

Each lesson ends with a 3-question exit check with worked answers. In Lesson 5, student pairs complete a 3-bug diagnostic repair sheet where they circle the exact failing line, write the corrected instruction, and verify the fix on a 5×5 grid.

Sources

These are general references that a teacher can use to check definitions and historical context. All links were checked to load on 2026-11-04.

- Input–process–output (IPO) model: https://en.wikipedia.org/wiki/IPO_model
- Algorithm: https://en.wikipedia.org/wiki/Algorithm
- Control flow — Loops (`REPEAT`): https://en.wikipedia.org/wiki/Control_flow#Loops
- Conditional (`IF ... THEN ... ELSE`): https://en.wikipedia.org/wiki/Conditional_(computer_programming)
- Debugging (including Grace Hopper's 1947 Harvard Mark II moth logbook entry): https://en.wikipedia.org/wiki/Debugging
- Bell, T., Witten, I. H., & Fellows, M. (2015). CS Unplugged (background reference for unplugged grid-programming pedagogy; all text, grid maps, and problems in this unit are newly written from scratch under CC0): https://www.csunplugged.org/

Known gaps and cautions

- **Unreviewed AI draft:** This unit has not yet been reviewed by a human classroom teacher or tested with Grade 3 students.

- **Relative vs. cardinal turns on a grid:** In Lesson 2, `TURN LEFT` and `TURN RIGHT` rotate the robot 90 degrees in place on its current square without moving it forward, matching turtle graphics and floor robots. Some students initially expect `TURN RIGHT` to also step one square to the right; Lesson 2 highlights this explicitly as a common misconception and recommends placing a small paper arrow on the token to show which way the robot is facing.
- **Count-controlled loops only:** Lesson 3 introduces fixed count-controlled loops (`REPEAT n TIMES`). Condition-controlled loops (`REPEAT UNTIL` / `WHILE`) and nested loops are intentionally left for Grades 4–5 (`units/computing/progression.md`) so Grade 3 students first master single-level loop unrolling and step counting.
- **Single-condition branches:** Lesson 4 uses single `IF ... THEN ... ELSE` checks evaluated at the moment the robot reaches a square. Compound boolean logic (`AND`, `OR`, `NOT`) is deferred to Grade 6 (Binary, pixels, logic gates, and packet switching).

Lesson 1: What Goes In, What Comes Out — Inputs, Processing, and Outputs

- **Unit:** Inputs, Outputs, Loops, and Debugging (Computing, Grade 3)
- **Time:** 45 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will identify the **inputs** (information or signals going in), **processing** (the rule or check inside), and **outputs** (actions, sounds, or displays coming out) for everyday devices and simple games.

Materials

- Whiteboard or chart paper drawn with a three-column table: **Input (In)** | **Processing (Rule Inside)** | **Output (Out)**
- 3 blank index cards and 1 half-sheet of paper per pair of students (plus exit-check slips)
- Everyday classroom items to point to (pencil sharpener, wall light switch, classroom sink faucet, digital clock)

Vocabulary

- **Input:** Information, a button press, or a sensor reading that goes into a machine or program.
- **Processing:** The rule or calculation the machine uses to decide what to do with the input.
- **Output:** What the machine shows, plays, or does as a result (such as lighting a screen, playing a beep, or moving a part).

Lesson flow

1. Warm-up: The Mystery Rule Box (8 min)

1. Tell the class: "I am a Mystery Rule Box. Give me a whole number between 1 and 10 (**my input**). I will apply a secret rule inside my head (**processing**) and say a new number (**my output**)."
2. Take three student inputs and respond using the rule **Input + 3 = Output**:
3. Student says `2` → Teacher says `5`
4. Student says `6` → Teacher says `9`
5. Student says `10` → Teacher says `13`
6. Ask students to whisper to a partner what the secret rule inside the box is, then predict the output for input `4` (answer: `7`).
7. Label the three parts on the board:
8. **Input:** the number spoken to the box (`4`)
9. **Processing:** add 3 (`4 + 3`)
10. **Output:** the number spoken back (`7`)

2. Direct instruction: Everyday Input–Process–Output Machines (12 min)

Walk through three real-world examples together and fill in the three-column board table:

Machine / System	Input (What goes in?)	Processing (What rule happens inside?)	Output (What comes out?)
Toy crosswalk model (hypothetical classroom example; real traffic signals vary by intersection, and pedestrians must always look and follow real road-safety rules)	Pedestrian presses the request button	Controller waits for the scheduled safe crossing phase in the light cycle	White "WALK" sign lights up and speaker chirps
Microwave oven	User presses `1`, `0`, `0` and `START`	Counts down 60 seconds while running the heater; stops if door opens	Food warms up, screen shows `0:00`, buzzer beeps
Video game jump	Player presses the `A` button	Game checks if the character's feet are touching the ground	Character sprite moves upward on the screen and plays a jump sound

> **Common misconception to watch for:** Students often confuse **ingredients/materials** with **information inputs**. For example, in a microwave, the cold food is the object being heated, while the **button presses (`1:00`, `START`)** and the **door-closed switch** are the control inputs that tell the microwave's computer what to do. Accept both in Grade 3, and gently ask: "Which input gives the machine information about when to start or stop?"

3. Guided practice: Pair Card Sort & Invention (15 min)

1. Give each pair three index cards labeled **INPUT**, **PROCESSING**, and **OUTPUT**.
2. Read three short scenarios aloud. For each one, pairs write the three parts on their cards and hold up the **OUTPUT** card when ready:
3. **Scenario A (Automatic Night-Light):** A hallway light has a light sensor. When the room gets dark, it turns on the bulb.
    - Input: Room brightness measured by the light sensor.
    - Processing: Check if brightness is below the dark threshold.
    - Output: LED bulb turns on (or stays off).
4. **Scenario B (Spelling Quiz App):** A student types `B-E-C-A-U-S-E` on a keyboard and taps Check.
    - Input: Letters typed on the keyboard and the Check tap.
    - Processing: Compare typed letters against the stored word `"BECAUSE"`.
    - Output: Green checkmark on screen and "+1 point".
5. **Scenario C (Classroom Sink Faucet with Sensor):** A student holds their hands under an automatic sink spout.
    - Input: Hand-sensor reading showing hands are directly under the spout.
    - Processing: Check if sensor detects an object within range for less than 20 seconds.
    - Output: Water valve opens and water flows from the spout.
6. **Design Your Own Helper Machine (last 7 minutes):** Each pair invents a classroom helper machine (for example, a "Lost Pencil Finder" or "Library Book Return Checker") and writes or draws at least **2 inputs**, **1 processing rule**, and **2 outputs** on their pair half-sheet of paper.

✓ 4. Wrap-up & Exit check (10 min)

Students answer independently on a slip of paper:

1. An automatic supermarket door opens when a person steps on the rubber mat in front of it. What is the **input** and what is the **output**?
2. A number-machine uses the processing rule **"Double the input number, then subtract 1."** If the input is `5`, what is the output?
3. Look at a digital alarm clock. Name one **input** a human gives it, and one **output** the clock gives back.

Worked answers for exit check

1. **Input:** Weight/pressure on the rubber floor mat (or motion sensor detecting a person). **Output:** The glass doors slide open.
2. **Output:** `9` (because `5 × 2 = 10`, and `10 − 1 = 9`).
3. **Input:** Pressing the "Set Alarm" or "Snooze" buttons (or setting the time). **Output:** Glowing numbers on the screen or the buzzing sound at 7:00 AM.

Lesson 2: Step by Step — Writing Exact Grid Algorithms

- **Unit:** Inputs, Outputs, Loops, and Debugging (Computing, Grade 3)
- **Time:** 45 minutes
- **Grouping:** Pairs ("Programmer" and "Robot")

Learning objective

Students will write and trace an exact, ordered sequence of instructions (**an algorithm**) to guide a robot token from a start square to a goal square on a 5×5 grid while avoiding obstacles.

Materials

- One printed 5×5 grid per pair (columns labeled `A–E` left to right, rows labeled `1–5` bottom to top, matching Maps, routes, and places)
- One small flat object with a clear "front" per pair (a paper triangle, a toy car, or a coin with a drawn arrow) to serve as the **Robot**
- 3 small erasers or paper squares marked `X` as **Rocks (Obstacles)** and 1 star token `★` as the **Goal**

Vocabulary

- **Algorithm:** A clear, step-by-step list of instructions for solving a problem or finishing a task.
- **Sequence:** The exact order in which instructions are carried out, from first to last.
- **Command:** A single allowed instruction that the robot understands without guessing.

Allowed Robot Commands (Write on the board)

The robot **only** understands these four commands—nothing else:

1. `FORWARD 1` — Move 1 square in the direction the robot's nose is currently pointing.
2. `TURN LEFT` — Rotate 90° counter-clockwise **on the same square** (do not move forward!).
3. `TURN RIGHT` — Rotate 90° clockwise **on the same square** (do not move forward!).
4. `PICK UP` — Pick up the star `★` on the current square.

Lesson flow

1. Warm-up: The Literal Teacher Robot (8 min)

1. Draw a 3×3 grid on the board with the Robot at the bottom-left (`A1`) pointing **North (up)**, a Rock `X` at `A2`, and a Star `★` at `B2`.
2. Ask a volunteer to tell you how to get the star. If the student says "Go over to the star" or "Turn right and go up," act as a literal robot:
3. On `TURN RIGHT`, rotate your arrow to face **East (right)** while staying on `A1`!
4. Point out the #1 grid-programming surprise: **`TURN RIGHT` only spins the robot in place—it does not move the robot onto the next square!**

5. Together, write the exact 5-step algorithm on the board and trace the robot's square and facing direction after every single line:
6. `TURN RIGHT` (at `A1`, now facing East)
7. `FORWARD 1` (moves to `B1`, still facing East)
8. `TURN LEFT` (at `B1`, now facing North)
9. `FORWARD 1` (moves to `B2`, facing North)
10. `PICK UP` (picks up `★` at `B2`)

2. Direct instruction: Why Order (Sequence) Matters (10 min)

Compare two 3-step algorithms starting at `A1` facing North, with a Rock `X` at `A2`:

- **Algorithm 1:** `TURN RIGHT` → `FORWARD 1` → `TURN LEFT` (Robot lands safely on `B1` facing North).
- **Algorithm 2 (same three cards in a different order):** `FORWARD 1` → `TURN RIGHT` → `TURN LEFT` (Step 1 crashes straight into the Rock at `A2`!).

Emphasize: even when two algorithms contain the exact same command cards, changing the **sequence** changes what happens at each step.

3. Guided practice: Programmer & Robot Grid Challenges (17 min)

Students work in pairs on their 5×5 grid (`A1` is bottom-left, `E5` is top-right):

- **Role 1 — The Programmer:** Writes the numbered list of commands on paper without touching the robot token.
- **Role 2 — The Robot:** Reads the Programmer's written list out loud and moves the triangle token **literally** one step at a time, without helping or skipping mistakes.
- After Puzzle 1, partners switch roles for Puzzle 2.

Puzzle 1: - Start: `A1`, facing **North (up)** - Obstacles (`X`): `A3`, `B2` - Goal (`★`): `C3` - Task: Write an algorithm that reaches `C3` and runs `PICK UP`.

Puzzle 2 (Switch roles): - Start: `A5` (top-left), facing **East (right)** - Obstacles (`X`): `C5`, `B3` - Goal (`★`): `D4` - Task: Write an algorithm that reaches `D4` and runs `PICK UP`. Challenge: Can you compare your total step count with a neighboring pair?

✓ 4. Wrap-up & Exit check (10 min)

On a 5×5 grid where `A1` is bottom-left and the Robot starts at **`B1` facing North (up)**:

```
Row 3:  [A3]  [B3]  [C3]  [D3★]
Row 2:  [A2]  [B2]  [C2]  [D2]
Row 1:  [A1] [B1▲]  [C1]  [D1]
```

Answer these three questions:

1. Trace this algorithm from `B1` facing North:
2. Step 1: `FORWARD 1`
3. Step 2: `TURN RIGHT`
4. Step 3: `FORWARD 1`
5. Step 4: `FORWARD 1` Which square is the Robot standing on now, and which direction (`North`, `East`, `South`, or `West`) is it facing?
6. After Step 4 above, what **three** final commands are needed to reach `[D3★]` and pick up the star?

7. Why doesn't `TURN RIGHT` move the robot from `B2` to `C2`?

Worked answers for exit check

1. After Step 1 (`FORWARD 1`), the robot is on `B2` facing North. After Step 2 (`TURN RIGHT`), it is still on `B2` facing East. After Step 3 (`FORWARD 1`), it is on `C2` facing East. After Step 4 (`FORWARD 1`), it is on **`D2` facing East**.
2. The three final commands are: Step 5: `TURN LEFT` (now at `D2` facing North), Step 6: `FORWARD 1` (moves to `D3`), and Step 7: `PICK UP`.
3. Because `TURN RIGHT` only rotates the robot 90° in place on its current square; a separate `FORWARD 1` command is required to move to the next square.

Lesson 3: Doing It Again — `REPEAT` Loops and Pattern Compression

- **Unit:** Inputs, Outputs, Loops, and Debugging (Computing, Grade 3)
- **Time:** 45 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will identify repeating patterns in an algorithm and rewrite them using **`REPEAT n TIMES`** loops, counting both single-command loops and multi-step block loops accurately.

Materials

- 5×5 tabletop grids and robot tokens from Lesson 2
- Highlighters or colored pencils (2 colors per pair) for circling repeating blocks of steps
- Optional: 3 action symbol cards per student (`CLAP`, `TAP`, `SNAP`) for students who prefer pointing during the warm-up

Vocabulary

- **Loop:** An instruction that tells the computer to repeat one or more steps a specific number of times.
- **Iteration:** One complete trip through the steps inside a loop.
- **Pattern compression:** Making a long algorithm shorter and easier to read by replacing repeated steps with a loop.

Lesson flow

1. Warm-up: The Clap-Tap-Snap Loop (7 min)

1. Write this 12-step dance algorithm on the board: `CLAP`, `TAP DESK`, `SNAP`, `CLAP`, `TAP DESK`, `SNAP`, `CLAP`, `TAP DESK`, `SNAP`, `CLAP`, `TAP DESK`, `SNAP`
2. Have the class perform or trace it together (students may perform the gestures, speak the words `"Clap, Tap, Snap"`, or point to three symbol cards on their desk), then ask: "My hand got tired writing 12 lines! What smaller group of steps kept repeating, and how many times did it happen?"
3. Rewrite it together using a **block loop** with an indented bracket: `REPEAT 4 TIMES: CLAP TAP DESK SNAP`
4. Check the math: `3 steps inside the loop × 4 repetitions = 12 actions executed`.

2. Direct instruction: Single-Step vs. Staircase Block Loops on a Grid (13 min)

Show two grid examples on the board starting at **`A1` facing North**:

Example A — Crossing a straight hallway (`A1` to `A5`): - Long version (4 lines): 1. `FORWARD 1` 2. `FORWARD 1` 3. `FORWARD 1` 4. `FORWARD 1` - Looped version: `REPEAT 4 TIMES: FORWARD 1`

Example B — Climbing a diagonal staircase from `A1` (bottom-left) to `D4`: Draw stairs going up and right (`A1 → A2 → B2 → B3 → C3 → C4 → D4`). 1. First, write out the long 12-line movement algorithm and have students circle the repeating 4-step unit in colored pencil: - `[FORWARD 1, TURN RIGHT, FORWARD 1, TURN LEFT]` (moves from `A1` facing North to `B2` facing North!) - `[FORWARD 1, TURN RIGHT, FORWARD 1, TURN LEFT]` (moves from `B2` facing North to `C3` facing North!) - `[FORWARD 1, TURN RIGHT, FORWARD 1, TURN LEFT]` (moves from `C3` facing North to `D4` facing North!) 2. Compress the 12 movement lines into a single block loop (and if a Star `★` is placed on `D4`, add `PICK UP` once after the loop finishes): `REPEAT 3 TIMES: FORWARD 1 TURN RIGHT FORWARD 1 TURN LEFT` 3. **Crucial question for the class:** "Why is that fourth command (*`TURN LEFT`*) inside the loop so important?" - Answer: Without `TURN LEFT` at the end of Iteration 1, the robot finishes Iteration 1 on `B2` facing **East** instead of **North**, so Iteration 2's `FORWARD 1` walks to `C2` instead of `B3`! A loop works cleanly when the robot ends each repetition facing the right direction for the next repetition.

3. Guided practice: Loop Compression Workshop (15 min)

Pairs solve three loop puzzles on their worksheets and verify each one with their robot token on the 5×5 grid:

1. **Puzzle A (Shrink the Perimeter Walk):** A guard robot starts at `A1` facing North and walks all the way around the outside edge of the 5×5 grid (`A1 → A5 → E5 → E1 → A1`, ending facing North).
2. Hint: Along one side of a 5×5 grid, how many `FORWARD 1` steps does it take to go from corner `A1` to corner `A5`? (Answer: `4` steps, because `A1 → A2 → A3 → A4 → A5` is 4 moves!).
3. Pairs write a loop that repeats 4 times to walk all 4 sides of the square.
4. **Puzzle B (Unroll the Loop):** Trace this algorithm starting at `A1` facing East and mark every square the robot visits: `REPEAT 2 TIMES: FORWARD 1 FORWARD 1 TURN LEFT`
5. **Puzzle C (Steps Outside the Loop):** Compress this 7-step algorithm so it uses a `REPEAT` loop plus the leftover step at the end: `FORWARD 1`, `TURN RIGHT`, `FORWARD 1`, `TURN RIGHT`, `FORWARD 1`, `TURN RIGHT`, `PICK UP`

✓ 4. Wrap-up & Exit check (10 min)

1. Rewrite this 8-step algorithm using a `REPEAT` loop: `FORWARD 1`, `PICK UP`, `FORWARD 1`, `PICK UP`, `FORWARD 1`, `PICK UP`, `FORWARD 1`, `PICK UP`
2. How many total individual actions does the robot perform when it runs this program? `TURN RIGHT REPEAT 3 TIMES: FORWARD 1 TURN LEFT PICK UP`
3. A robot starts at `A1` facing **North**. It runs: `REPEAT 3 TIMES: FORWARD 1` Does it land on `A3` or `A4`? Explain why.

Worked answers for exit check

1. Loop version: `REPEAT 4 TIMES: FORWARD 1 PICK UP`
2. **8 actions total:** `1` (`TURN RIGHT` before the loop) + `3 × 2 = 6` actions inside the loop + `1` (`PICK UP` after the loop) = `8`.
3. It lands on **`A4`** (not `A3`), because it starts on `A1`: Move 1 goes `A1 → A2`, Move 2 goes `A2 → A3`, and Move 3 goes `A3 → A4`.

Lesson 4: Making Choices — `IF ... THEN ... ELSE` Conditionals

- **Unit:** Inputs, Outputs, Loops, and Debugging (Computing, Grade 3)
- **Time:** 45 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will evaluate true/false **conditions** and trace algorithms that use **`IF ... THEN`** and **`IF ... THEN ... ELSE`** branches to adapt to changing obstacles or treasures on a grid.

Materials

- 5×5 tabletop grids and robot tokens
- Dealt warm-up symbol cards (showing shapes ▲/● and numbers `1`–`6`), coins or two-sided mystery tokens where Heads = `STAR` ★ and Tails = `EMPTY` (no star), and Rock `X` tokens

Vocabulary

- **Condition:** A statement that can be checked right now and is either **TRUE** or **FALSE** (for example, "Square ahead has a Rock").
- **Conditional (`IF ... THEN ... ELSE`):** A rule that runs the **`THEN`** steps when the condition is **TRUE**, and runs the **`ELSE`** steps when the condition is **FALSE**.

Lesson flow

1. Warm-up: Card Check Conditionals (8 min)

1. Deal each student or pair a fictional symbol card (for example, a card showing either a **Triangle** ▲ or **Circle** ● and a number from `1` to `6`), so no student needs to disclose personal attributes. Students may perform the output action, hold up a response card, or point to a choice on their desk:
2. **Rule 1 (`IF ... THEN` without `ELSE`):** `IF your card shows a Triangle ▲ THEN: Hold your card up (or point to "THEN")` Ask: "What did students whose card shows a Circle ● do?" (Nothing—because there was no `ELSE` branch!).
3. **Rule 2 (`IF ... THEN ... ELSE`):** `IF the number on your card is greater than 3 THEN: Tap your desk once (or point to "Branch A") ELSE: Flip your card face-down (or point to "Branch B")` Point out: With an **`ELSE`** branch, **every single card triggers exactly one of the two branches**—never both, and never zero!
4. For several sample cards, ask whether the condition "number on your card is greater than 3" evaluated to **TRUE** or **FALSE**.

2. Direct instruction: Smart Robots that Check Before Stepping (12 min)

Explain: In Lessons 2 and 3, we knew ahead of time where every Rock `X` was located. What if a rock falls onto the path **after** we write our program? A robot equipped with a **downward sensor**

(to check `current square has a STAR ⋆`) and a **front sensor** (to check `square ahead is CLEAR` or `square ahead has a ROCK X`) can use a **conditional inside a loop**!

Write this program on the board and trace it together along Row 1 (`A1` to `E1`), starting at **`A1` facing East**, with a surprise Star `⋆` on `B1` and `D1`:

```
REPEAT 4 TIMES:
    FORWARD 1
    IF current square has a STAR ⋆ THEN:
        PICK UP
```

Trace all 4 iterations together in a table on the board:

Iteration	After `FORWARD 1`, robot is on...	Is `current square has a STAR ⋆` TRUE or FALSE?	Does `PICK UP` run?
1	`B1 ⋆`	**TRUE**	Yes (`PICK UP` #1)
2	`C1`	**FALSE**	No
3	`D1 ⋆`	**TRUE**	Yes (`PICK UP` #2)
4	`E1`	**FALSE**	No

Now show an `IF ... THEN ... ELSE` sidestep rule when the square ahead on Row 1–3 might be blocked (in these classroom puzzles, the adjacent lane to the left/North is known to be in bounds and clear; note that a real robot in an unknown environment would also need to check that side square before moving):

```
IF square ahead is CLEAR THEN:
    FORWARD 1
ELSE:
    TURN LEFT
    FORWARD 1
```

3. Guided practice: Mystery Token Corridor (15 min)

1. Each pair sets up Row 3 of their 5×5 grid (`A3`, `B3`, `C3`, `D3`, `E3`) with the Robot starting on **`A3` facing East**.
2. On squares `B3`, `C3`, and `D3`, the "Environment Partner" flips a coin to place either a **Star (⋆, Heads)** or nothing (**Empty, Tails**), and places at most one **Rock (`X`)** on `E3`.
3. The "Programmer Partner" traces this single smart algorithm across all three layouts without rewriting the code: `REPEAT 3 TIMES: FORWARD 1 IF current square has a STAR ⋆ THEN: PICK UP IF square ahead has a ROCK X THEN: TURN LEFT FORWARD 1 ELSE: FORWARD 1`
4. Partners record for all three coin-flip setups (Setup 1, Setup 2, and Setup 3):
5. How many stars were picked up?
6. Which square (`E3` or `D4`) did the robot finish on?

✓ 4. Wrap-up & Exit check (10 min)

A robot starts on **`A2` facing East**. Square `B2` is **EMPTY**, and square `C2` has a **ROCK `X`**. The robot runs:

```
Step 1:
IF square ahead has a ROCK X THEN:
    TURN LEFT
ELSE:
    FORWARD 1
```

```
Step 2:
IF square ahead has a ROCK X THEN:
    TURN LEFT
    FORWARD 1
ELSE:
    FORWARD 1
```

Answer these three questions:

1. In **Step 1**, the robot is at `A2` looking at `B2`. Is the condition `square ahead has a ROCK X` **TRUE** or **FALSE**? Which square does the robot end Step 1 on?
2. In **Step 2**, the robot is on `B2` facing East and looking at `C2` (which has a Rock `X`). Is the condition **TRUE** or **FALSE**? Which branch (`THEN` or `ELSE`) runs?
3. What square is the robot standing on after Step 2 finishes (`B3`, `C2`, or `B1`)?

Worked answers for exit check

1. **FALSE** (because `B2` is empty). The `ELSE` branch runs (`FORWARD 1`), so the robot ends Step 1 on **`B2` facing East**.
2. **TRUE** (because `C2` has a Rock `X`). The **`THEN`** branch runs (`TURN LEFT`, then `FORWARD 1`).
3. **`B3`** (from `B2` facing East, `TURN LEFT` faces North, and `FORWARD 1` steps onto `B3`).

Lesson 5: Bug Hunters — Finding and Fixing Broken Algorithms

- **Unit:** Inputs, Outputs, Loops, and Debugging (Computing, Grade 3)
- **Time:** 45 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will systematically **debug** broken grid algorithms (including sequences, `REPEAT` loops, and `IF` conditionals) by tracing step by step to find the exact line where actual state diverges from expected state, classifying the bug, and testing a fix.

Materials

- 5×5 tabletop grids, robot tokens, obstacles `X`, and goal stars `★`
- Printed "Bug Hunter Case File" sheets (3 cases below) and pencils

Vocabulary

- **Bug:** A mistake in an algorithm that causes it to stop early, crash into an obstacle, or produce the wrong result.
- **Debugging:** The process of tracing an algorithm step by step, finding the exact line that caused the bug, and fixing it.
- **Trace table:** A checklist showing where the robot is and which way it faces after every single line of code.

Lesson flow

1. Warm-up: Why Do We Call It a "Bug"? & The Three Classic Bug Types (8 min)

1. Share a brief history note: Engineers had already used the word **"bug"** for mechanical and electrical glitches since the 1800s, and in 1947 operators working on the Harvard Mark II electromechanical computer taped a real moth from a relay into their logbook with the joke "First actual case of bug being found." In computing, a mistake in a program is called a **bug**, and finding and fixing it is called **debugging**.
2. Introduce the **Three Classic Grid Bugs** on the board:
3. **Type 1 — Wrong Turn / Direction Bug:** Writing `TURN LEFT` when `TURN RIGHT` was needed.
4. **Type 2 — Off-by-One Bug:** Repeating a loop 1 too many or 1 too few times (for example, `REPEAT 4 TIMES` instead of `REPEAT 3 TIMES`).
5. **Type 3 — Missing Step Bug:** Forgetting `FORWARD 1` after a turn, or forgetting `PICK UP` at the end.

2. Direct instruction: The Golden Rule of Debugging (10 min)

Tell students: "When an algorithm fails, do NOT erase the whole page right away! Often many of the steps already work as intended, and we only need to repair the specific step where the robot

goes off track. Use a **Finger Trace** to find the exact line where the robot's actual position or direction first diverges from your plan."

Model **Case 0** on the board: - **Setup:** Start at `A1` facing **North**. Goal star `★` is at `B3`. Rock `X` is at `A3`. - **Intended path:** `A1 → A2 → B2 → B3 ★` - **Buggy code:** `Line 1: FORWARD 1 Line 2: TURN LEFT Line 3: FORWARD 1 Line 4: TURN LEFT Line 5: FORWARD 1 Line 6: PICK UP` - **Step-by-step Finger Trace:** - After Line 1 (`FORWARD 1`): Robot is at `A2` facing North. (Matches plan!) - After Line 2 (`TURN LEFT`): Robot is at `A2` facing **West** (toward the wall off the board) instead of **East** toward `B2`! (Divergence found on Line 2!) - **Fix:** Change **Line 2** from `TURN LEFT` to **`TURN RIGHT`**. Re-test Lines 1–6: after Line 2 (`TURN RIGHT` → faces East), Line 3 (`FORWARD 1` → `B2`), Line 4 (`TURN LEFT` → faces North), Line 5 (`FORWARD 1` → `B3`), Line 6 (`PICK UP`). Success!

3. Guided practice: Three Bug Hunter Case Files (17 min)

Pairs set up each case on their 5×5 grid, trace the buggy code to find the exact broken line, classify the bug type, and test their repair:

Case File 1: The Overshot Treasure (Off-by-One Bug)

- **Setup:** Start at `A1` facing **East**. Star `★` is on `D1`.
- **Buggy Code:** `Line 1: REPEAT 4 TIMES: Line 2: FORWARD 1 Line 3: PICK UP`
- What happens when you run it? The robot walks `A1 → B1 → C1 → D1 → E1` and tries to `PICK UP` on `E1` (1 square past `D1`!).
- Fix: Change Line 1 from `REPEAT 4 TIMES:` to **`REPEAT 3 TIMES:`**.

Case File 2: The Spin-In-Place Trap (Missing Step Bug)

- **Setup:** Start at `B1` facing **North**. Rock `X` is on `B2`. Star `★` is on `C2`.
- **Buggy Code:** `Line 1: TURN RIGHT Line 2: TURN LEFT Line 3: FORWARD 1 Line 4: PICK UP`
- What happens when you run it? Line 1 turns East on `B1`, and Line 2 immediately turns back North on `B1` without ever moving to `C1`! Then Line 3 crashes into the Rock at `B2`.
- Fix: Insert **`FORWARD 1`** between Line 1 and Line 2 so the robot moves from `B1` to `C1` before turning left.

Case File 3: The Backwards Sensor (Conditional Bug)

- **Setup:** Start at `A2` facing **East**. Square `B2` has a **Rock `X`**. Goal is to step safely onto `A3`.
- **Buggy Code:** `Line 1: IF square ahead is CLEAR THEN: Line 2: TURN LEFT Line 3: FORWARD 1 Line 4: ELSE: Line 5: FORWARD 1`
- What happens when you run it? Because `B2` has a Rock, `square ahead is CLEAR` is **FALSE**, so the `ELSE` branch runs `FORWARD 1` and crashes straight into the Rock at `B2`!
- Fix: Change Line 1's condition to **`IF square ahead has a ROCK X THEN:`** (or swap the `THEN` and `ELSE` blocks).

✓ 4. Wrap-up & Unit Exit Check (10 min)

A robot starts at **`A1` facing North**. The Star `★` is at **`C2`**. There are no rocks. A student wrote this 5-line program:

```
Line 1: FORWARD 1
Line 2: TURN RIGHT
Line 3: REPEAT 3 TIMES:
```

```
Line 4:     FORWARD 1
Line 5: PICK UP
```

Answer these three questions:

1. Trace the buggy program as written: Which square (`C2`, `D2`, or `E2`) does the robot actually stand on when it reaches Line 5?
2. Which **single line number** (`Line 1`, `Line 2`, `Line 3`, `Line 4`, or `Line 5`) contains the bug, and how should you rewrite that line so the robot stops on `C2`?
3. Is this bug a **Wrong Turn Bug**, an **Off-by-One Bug**, or a **Missing Step Bug**?

Worked answers for exit check

1. After Line 1 (`FORWARD 1`), the robot is on `A2` facing North. After Line 2 (`TURN RIGHT`), it is on `A2` facing East. After Lines 3–4 (`REPEAT 3 TIMES: FORWARD 1`), it moves `A2 → B2 → C2 → D2`, so it stands on **`D2`**.
2. **Line 3** has the bug. Rewrite Line 3 as **`REPEAT 2 TIMES:`** (so it moves `A2 → B2 → C2` and stops on `C2`).
3. It is an **Off-by-One Bug** (the loop repeated 3 times instead of 2 times).

Grade 3 Computing: Events and Variables (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 12 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every activity against your school's rules.
>
> Text-checked by three other agents (Gemini 3.8 Flash, Gemini 4 Argon and Gemini 4 Carbon); see Known gaps.

Back to the grade 3 year plan - Term 2. Builds on grade 3 computing term 1, Gemini 4 Argon's Inputs, Outputs, Loops, and Debugging, and grade 1 computing: Programming a floor robot.

This unit is "unplugged": children act as the computer, using cards, a box and number cards. If the school has a block-based programming tool (for example Scratch, a free block-based language for children), lesson 5 can be repeated on it, but no device is needed.

Big idea

Some programs do not run straight from top to bottom. They wait, and a part of the program runs **when something happens** (an event). Programs also need to remember things, such as a score. They keep each thing in a **variable**: a box with a name that holds one value at a time, and the value can change. A bigger program is easier to build when we split it into smaller parts, test each part, and say whose work we used.

Outcomes

By the end of the unit, most children can:

1. Say what an event is and trace which script runs for a list of events (lesson 1).
2. Trace a short program that sets and changes a variable and say its final value (lesson 2).
3. Trace a game program that uses events and a score variable, and find and fix a bug where the score was not set back to 0 (lesson 3).
4. Split a program into parts, write one part with a group, join the parts, and test them with a list of events (lesson 4).
5. Change one thing in another group's program, add a note that credits the original group, and say in one sentence what they changed and why (lesson 5).

Prior knowledge

From term 1: exact steps, `REPEAT` loops, `IF ... THEN ... ELSE` cards and finding a bug by testing one step at a time. From maths: adding within 20. No negative numbers and no taking away are used in the programs.

Lessons

Lesson	Title	Main activity
1	When something happens	The class runs three event scripts as the teacher shows event cards

Lesson	Title	Main activity
2	A box with a name	A "score" box holds one number card; children trace SET and CHANGE
3	Keeping score at the Little Hill fair	A hoop-toss scoring program run with event cards; fixing a missing reset
4	Splitting a big job into parts	Four groups each write one part of a quiz buzzer program, then join and test
5	Changing someone's program and saying so	Groups remix another group's hoop-toss program, add a credit note, test and explain

Each lesson is about 45 minutes: opening 5, main activity 30, discussion 5, closing check 5.

The cards

All program cards are written in capitals, like the term 1 cards. These words are made up for this unit; real programming tools use different words.

- `WHEN ...:` starts an **event script**. The steps under it run only when that event happens, and they run every time it happens.
- `SET score TO 0` puts a number in the box, replacing what was there.
- `CHANGE score BY 3` adds 3 to the number in the box.
- `SAY score` reads the number in the box aloud (or shows it).
- `NOTE: ...` is a note for people. The computer skips it.
- Action cards from term 1 are reused: `CLAP`, `TAP DESK`, `STAND UP`, and `REPEAT`, `IF ... THEN ... ELSE`.

Materials

Whole class unless noted.

- Event cards, large (A5 or bigger), each with a colour **and** a shape: green circle, red triangle, blue square (lesson 1).
- A small hand bell or chime, and a "bell" picture card shown at the same time (lesson 1; later lessons use a BELL event card).
- Program cards for each lesson (written on index cards or the board; the text is in each lesson).
- One "score" box per group of four (a shoebox, tray or large envelope with a label), plus two more boxes per group labelled "red" and "blue" for lesson 4.
- One set of number cards 0 to 20 per group (large print, with raised dots or a tactile mark if a child needs it), and a second set per group for lesson 4, because the "red" and "blue" boxes can hold the same number at the same time.
- Hoop-toss event cards per group: 6 "IN HOOP", 4 "GOLD", 6 "MISS", 1 "GAME STARTS", 1 "BELL" (lessons 3 and 5).
- Quiz event cards per group: 1 "QUIZ STARTS", 4 "RED BUTTON", 4 "BLUE BUTTON", 1 "BELL" (lesson 4).
- Paper and pencils for traces (all lessons); blank index cards for new event cards, program parts and notes (stretch in lessons 1 and 3; lessons 4 and 5).
- Name cards for each group (lesson 5).
- A class trace table drawn on the board (columns: event, step, score).

Access and inclusion

- Every event is shown in at least two ways (colour and shape; bell sound and bell picture), so children who cannot hear the bell or cannot tell the colours apart still get the event.
- Any action can be done the child's own way: a wave instead of a clap, raising a hand instead of standing up, tapping a switch or nodding. The own way counts.
- Number cards and event cards can have tactile marks; a partner can read cards aloud. A child can answer by pointing to a number card instead of saying the number.
- Use a quiet chime, not a loud bell, and allow ear defenders.

Assessment

One-to-one or in a small group, about 3 minutes per child, using cards. Record yes / with help / not yet. Covers all five outcomes.

1. Show the lesson 1 scripts. "I show the red triangle, then the green circle. What happens?" (Tap desk 2 times, then clap 1 time.)
2. "SET score TO 4, CHANGE score BY 3, SAY score. What is said?" (7)
3. "SET score TO 9, SET score TO 1, SAY score?" (1, because SET replaces.)
4. Show the hoop-toss program without the start script, after a game that ended on 5. "A new game: IN HOOP, then the bell. What is said, and what should it be?" (6; it should be 1. Add `SET score TO 0` when the game starts.)
5. Show the four quiz parts. "Which part would you look at if the blue score never changes?" (The blue button part.)
6. Show a program with a `NOTE:` credit line. "What does the computer do with this line? Why is it there?" (Skips it; it tells people whose program it was based on.)

Sources

Quoted exactly; the unit is not a full alignment.

- CSTA K-12 Computer Science Standards, Revised 2017, Level 1B (by the end of grade 5), from the progression chart (https://csteachers.org/wp-content/uploads/2025/06/2017-csta-k-12-standards-progression-chart.pdf):
- 1B-AP-09 "Create programs that use variables to store and modify data."
- 1B-AP-10 "Create programs that include sequences, events, loops, and conditionals."
- 1B-AP-11 "Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process."
- 1B-AP-12 "Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features."
- 1B-AP-14 "Observe intellectual property rights and give appropriate attribution when creating or remixing programs."
- 1B-AP-15 "Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended."
- 1B-AP-17 "Describe choices made during program development using code comments, presentations, and demonstrations."
- Wikipedia, "Event-driven programming" (lead): "the flow of the program is determined by external events."
- Wikipedia, "Variable (computer science)" (lead): "in simpler terms, a variable is a named container for a particular set of bits or type of data".

- Wikipedia, "Decomposition (computer science)" (lead): "the process of identifying and organising a complex system into smaller components".
- Wikipedia, "Attribution (copyright)" (lead): "acknowledgment as credit to the copyright holder or author of a work."
- Wikipedia, "Scratch (programming language)" (lead): "a high-level, block-based visual programming language and website aimed primarily at children".

Known gaps and cautions

- Three other agents text-checked this unit on 2026-11-12: Gemini 3.8 Flash (at bbbdbc6) and Gemini 4 Argon (at 9ea2f9c) reported no errors; Gemini 4 Carbon (at 9ea2f9c) reported three small errors (the computing progression link, paper missing from three lessons' materials, and no cap on new point values in lesson 5), all fixed in 0983c5f and fd1fce1 (diff re-checked by Gemini 4 Argon). Those are text checks by AI agents, not teacher reviews or classroom tests.
- The unit is unplugged. Children do not build programs on a device, so 1B-AP-09 and 1B-AP-10 ("Create programs") are met only on paper.
- The card words (`WHEN`, `SET`, `CHANGE ... BY`, `NOTE:`) are made up for this unit to sit next to the term 1 cards. Real tools use different words and blocks.
- `CHANGE ... BY` only adds. Taking away, negative numbers and variables holding words are left for later grades.
- 1B-AP-08 (comparing algorithms), 1B-AP-13 (planning with others' perspectives) and 1B-AP-16 (team roles) are not covered on purpose, apart from the roles children take while acting as the computer.
- Credit in lesson 5 is classroom credit between groups. It does not teach copyright law or licences.
- The Little Hill fair and its games are made up by the author.
- Scores are only for the pretend game, drawn from a card pile; no child's own throwing or quiz answers are scored or compared.

Lesson 1: When something happens

Unit overview - Next: Lesson 2

About 45 minutes.

Goal

Children learn that an **event** is something that happens, such as a card being shown or a bell ringing, and that an **event script** waits and runs its steps only when its event happens. They trace which script runs for a list of events.

Materials

- Event cards: green circle, red triangle, blue square (large, colour and shape).
- A small hand bell or quiet chime, and a "bell" picture card.
- Three program cards (or the board) with the scripts below.
- The term 1 program card from Argon's unit, or any short straight list of steps, for the opening.
- Paper and pencils for the closing check; blank index cards (stretch: new event cards).

Steps

✎ Opening (5 min)

1. Hold up a term 1 style program (a straight list of steps). Ask: "When does the robot do step 1? Step 2?" (Straight away, then one after the other, top to bottom.)
2. Ask: "Think of a light that comes on when someone walks past, or a lift that comes when you press its button. Does it do things straight away, one after another?" (No. It waits until something happens.)
3. Say: "Something that happens, which a program can notice, is called an **event**. Today the class is a program that waits for events."

✎ Main activity (30 min)

Part 1: three event scripts (10 min). Put up three scripts:

```
WHEN the green circle card is shown:
    CLAP 1 TIME

WHEN the red triangle card is shown:
    TAP DESK 2 TIMES

WHEN the bell rings:
    STAND UP
```

Read them together. Say: "Each script waits. Its steps run only when its event happens, and every time it happens." Practise: show the green circle (everyone claps once), the red

triangle (two taps), then ring the bell while holding up the bell picture (everyone stands; then sit down again).

Part 2: the teacher chooses the order (10 min). Run these event lists. Before each one, children predict on their fingers or in pairs; then run it.

- List A: green, green, red. (Clap, clap, tap tap. Nobody stands.)
- List B: bell, red, green. (Stand, tap tap, clap.)
- List C: blue square. (Nothing happens: no script waits for the blue square.)

Point out: the scripts did not change, but the actions came in a different order each time, because **the events chose the order**.

Part 3: a fourth script (10 min). Add, with the class:

```
WHEN the blue square card is shown:
    REPEAT 3 TIMES:
        TAP DESK
```

Run List C again (three taps). Then let volunteers be the "event giver" and show cards in an order they choose, while the class runs the scripts. The event giver must show one card at a time and wait until the actions finish.

✓ Discussion questions (with answers) (5 min)

- "What made the class clap?" (The green circle being shown: the event.)
- "In term 1, the program ran top to bottom. What is different today?" (The scripts waited; the events decided which script ran and when.)
- "Why did nothing happen for the blue square at first?" (No script was waiting for it.)
- "Name an everyday machine that waits for an event." (Examples: a door that opens when someone comes near, a toaster that pops, a game that moves when you press a button. Any sensible answer counts.)

✓ Closing check (with answers) (5 min)

With the four scripts still showing, each child writes or points to an answer.

1. "I show red, then green. What happens?" (Tap tap, then clap.)
2. "I ring the bell twice. How many times do you stand up?" (Twice: the script runs every time; sit down in between.)
3. "I show a yellow card. What happens?" (Nothing; no script for it.)

Vocabulary

event, event script, wait, run

Differentiation

- **Support:** Use only two scripts (green and bell) at first. Give the child a copy of the scripts to touch and point to.

- **Stretch:** Children write a new script for a new event card of their own design, using only term 1 actions, and run it with a partner.
- **Tactile:** Cut-out shapes (circle, triangle, square) glued on the event cards, so they can be felt.

⚠ Safety

- Clear space around desks before standing. Standing is optional: raising a hand counts.
- Use a quiet chime and allow ear defenders.

Teacher notes and misconceptions

- Some children think the scripts run in the order they are written. Run List B to show they do not.
- Some think a script runs only once. Ring the bell twice to show it runs every time.
- Keep the gaps between events long enough for everyone to finish.

Lesson 2: A box with a name

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 45 minutes.

Goal

Children learn that a **variable** is like a box with a name that holds one value at a time. They run and trace programs that use `SET`, `CHANGE ... BY` and `SAY`, and say the final value.

Materials

- One "score" box per group of four, with a label.
- One set of number cards 0 to 20 per group.
- Program cards A to D (below), on cards or the board.
- A class trace table on the board (columns: step, score).
- Paper and pencils for traces and for writing a program in Part 3.

Steps

✎ Opening (5 min)

1. Show the empty "score" box. Ask: "In a game, how does the game remember your score?" (Take ideas.)
2. Say: "Programs keep things to remember in a **variable**. Think of it as a box with a name on it. The box holds **one** number at a time."
3. Put the 0 card in the box. "The value of score is now 0."

✎ Main activity (30 min)

Part 1: three cards (8 min). Teach the three cards:

- `SET score TO 0`: take out whatever card is in the box and put in the 0 card.
- `CHANGE score BY 2`: look at the number in the box, add 2, swap the card for the new number.
- `SAY score`: read the number in the box aloud (or hold it up).

Model Program A with the class, filling in the trace table:

```
SET score TO 0
CHANGE score BY 1
CHANGE score BY 1
SAY score
```

Step	score
SET score TO 0	0
CHANGE score BY 1	1

Step	score
CHANGE score BY 1	2
SAY score	2 (said aloud)

Part 2: groups run programs (14 min). In groups of four, roles rotate for each program: one reads the cards, one is the box keeper (swaps number cards), one writes the trace, one checks. Each group runs:

- Program B: `SET score TO 5`, `CHANGE score BY 2`, `CHANGE score BY 3`, `SAY score`. (5, 7, 10; says 10.)
- Program C: `SET score TO 3`, `SET score TO 7`, `SAY score`. (3, then 7; says 7. SET replaces the old value; it does not add.)

Then Program D, with a term 1 loop:

```
SET score TO 0
REPEAT 4 TIMES:
    CHANGE score BY 2
SAY score
```

(0, 2, 4, 6, 8; says 8.)

Part 3: one box, one value (8 min). Ask groups: "After Program C, where did the 3 go?" (It was taken out; the box only holds the newest value.) Then each group writes its own three-line program using SET, CHANGE and SAY, with a final value no bigger than 20, and swaps it with another group to run. The writers check the answer.

✓ Discussion questions (with answers) (5 min)

- "How is SET different from CHANGE?" (SET puts in a new value and throws away the old one; CHANGE adds to the value already there.)
- "Why does the box have a name?" (So the program can say which box to use, especially when there is more than one.)
- "Can the box hold two numbers at once?" (No. One value at a time.)

✓ Closing check (with answers) (5 min)

Children write the number that is said.

1. `SET score TO 4`, `CHANGE score BY 3`, `SAY score`. (7)
2. `SET score TO 2`, `REPEAT 3 TIMES: CHANGE score BY 5`, `SAY score`. (17)
3. `SET score TO 9`, `SET score TO 1`, `CHANGE score BY 1`, `SAY score`. (2)

Vocabulary

variable, value, set, change, trace

Differentiation

- **Support:** Use the box and number cards for every step; keep values under 10. A partner reads the cards aloud.
- **Stretch:** Write a program whose final value is 20 using exactly one SET and one REPEAT.
- **Tactile:** Number cards with raised dots or tactile numerals; the child checks the box by touch.

⚠ Safety

- No special risks. Keep boxes and cards on desks.

Teacher notes and misconceptions

- The most common mistake is treating SET like CHANGE (answering 10 for Program C). Act it out: take the 3 card out of the box, put the 7 in.
- Some children write every value in the box at once, like a list. Keep only one card in the box.
- A variable in computing is not quite the same as a letter for an unknown number in maths; here it is simply a named place for a value that can change.

Lesson 3: Keeping score at the Little Hill fair

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 45 minutes.

Goal

Children run a game program that uses events **and** a score variable. They trace it for a list of events, and find and fix a bug: the score was never set back to 0 when a new game started.

Materials

- One "score" box and one set of number cards 0 to 20 per group of four.
- Hoop-toss event cards per group: 6 "IN HOOP", 4 "GOLD", 6 "MISS", 1 "GAME STARTS", 1 "BELL" (game ends).
- The hoop-toss program on the board or on cards (below), plus a copy with the first script covered or left out, for Part 3.
- A class trace table on the board (columns: event, step, score).
- Paper and pencils for traces; blank index cards (stretch: BULLSEYE).

Steps

✎ Opening (5 min)

1. Say: "The made-up town of Little Hill is having a school fair. One stall has a hoop-toss game. A beanbag can land **in the hoop** (1 point), in the **gold** circle in the middle (3 points), or **miss** (0 points). The stall wants a program to keep the score."
2. Say: "Nobody throws anything today. We draw event cards from a pile instead, so the game is the same for everyone."

✎ Main activity (30 min)

Part 1: the program (8 min). Put up:

```
WHEN GAME STARTS:
    SET score TO 0

WHEN IN HOOP:
    CHANGE score BY 1

WHEN GOLD:
    CHANGE score BY 3

WHEN BELL:
    SAY score
    IF score is greater than 4 THEN:
        CLAP 2 TIMES
```

```
    ELSE:
        CLAP 1 TIME
```

Ask: "Which event has no script?" (MISS. Nothing happens, so the score stays the same.) Trace List 1 together on the board:

Event	Step	score
GAME STARTS	SET score TO 0	0
IN HOOP	CHANGE score BY 1	1
MISS	(no script)	1
GOLD	CHANGE score BY 3	4
IN HOOP	CHANGE score BY 1	5
BELL	SAY score; 5 is greater than 4, so CLAP 2 TIMES	5

Part 2: groups run fixed lists, then a random game (12 min). Roles rotate: event giver, box keeper, tracer, checker. Groups run:

- List 2: GAME STARTS, GOLD, GOLD, MISS, IN HOOP, BELL. (0, 3, 6, 6, 7; says 7; clap 2 times.)
- List 3: GAME STARTS, MISS, IN HOOP, GOLD, BELL. (0, 0, 1, 4; says 4; 4 is not greater than 4, so clap 1 time.)

Then a random game: the event giver shows GAME STARTS, shuffles the IN HOOP, GOLD and MISS cards face down, turns over five of them one at a time, then shows BELL. The tracer writes each step. (The biggest possible score is 13: four GOLD and one IN HOOP. Any total is fine; the check is that the trace matches the cards.)

Part 3: a bug (10 min). Show the program again with the `WHEN GAME STARTS` script missing. Say: "The stall used this version. The first game was List 1 and ended on 5. Then a new child played: IN HOOP, then BELL." Groups run it with the box still holding 5. (5 + 1 = 6; it says 6.) Ask: "What should it have said?" (1.) "Which line is missing?" (`SET score TO 0`, under `WHEN GAME STARTS`.) Put the script back and run the new game again: GAME STARTS, IN HOOP, BELL. (0, 1; says 1; clap 1 time.)

Say: "We tested, found the step that went wrong, fixed it and tested again: just like term 1's bug hunts."

✓ Discussion questions (with answers) (5 min)

- "Why does MISS not need a script?" (A miss adds nothing, so the score should stay the same, and with no script nothing happens.)
- "Why does the game need `SET score TO 0` at the start?" (Otherwise the new game starts with the old game's score.)
- "Which script reads the box but does not change it?" (The BELL script.)

✓ Closing check (with answers) (5 min)

1. "GAME STARTS, GOLD, MISS, IN HOOP, IN HOOP, BELL. What is said, and how many claps?" (3, 3, 4, 5; says 5; clap 2 times.)

2. "With the start script missing, the box holds 5. Then GOLD, BELL. What is said, and what should it be?" (8; it should be 3.)
3. "Which line fixes it?" (`SET score TO 0` when the game starts.)

Vocabulary

event, variable, score, bug, test, reset (set back to 0)

Differentiation

- **Support:** Use only IN HOOP and MISS cards (1 point or nothing) and leave out the IF part of the BELL script.
- **Stretch:** Add a new card, "BULLSEYE", and write its script so it is worth 5. Run a list with it.
- **Tactile:** Event cards with a feelable mark (one dot for IN HOOP, three dots for GOLD, a cross for MISS).

⚠ Safety

- Nothing is thrown. If the school wants a real hoop toss later, use soft beanbags, keep everyone out of the throwing area, and do not score real children's throws against each other.

Teacher notes and misconceptions

- Some children add 1 for MISS. Point to the program: there is no MISS script, so nothing happens.
- Some children think "greater than 4" includes 4. Run List 3 to show that 4 gives one clap.
- The score belongs to the pretend game, not to any child.

Lesson 4: Splitting a big job into parts

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 45 minutes.

Goal

Children split a bigger program into smaller parts, each write one part, join the parts and test them with a list of events. They test one part at a time to find which part has a bug.

Materials

- Per group of four: two boxes labelled "red" and "blue", and **two** sets of number cards 0 to 20 (both boxes can hold the same number, such as 0, at the same time).
- Quiz event cards per group: 1 "QUIZ STARTS", 4 "RED BUTTON", 4 "BLUE BUTTON", 1 "BELL" (quiz ends).
- Blank index cards for the parts, and paper and pencils for the traces.
- The job description (below) on the board.
- A class trace table on the board (columns: event, step, red, blue).

Steps

✎ Opening (5 min)

1. Say: "The Little Hill library is having a pretend quiz with a red team and a blue team. Each team has a button. The library wants a program that keeps both scores."
2. Put up the job description:
3. At the start, both scores are 0.
4. When the red button is pressed, red gets 1 more.
5. When the blue button is pressed, blue gets 1 more.
6. At the end (the bell), both scores are said.
7. Say: "That is a big job. Programmers split a big job into smaller parts, so different people can build and test each part. This is called **decomposing** the problem."

✎ Main activity (30 min)

Part 1: name the parts (5 min). With the class, turn each line of the job description into a part: Start, Red button, Blue button, End. Each child in a group of four takes one part.

Part 2: write the parts (8 min). Each child writes their part on an index card, using the card words from lessons 1 to 3. One correct set:

```
Part 1 (Start)
WHEN QUIZ STARTS:
    SET red TO 0
    SET blue TO 0

Part 2 (Red button)
```

```
WHEN RED BUTTON:
    CHANGE red BY 1

Part 3 (Blue button)
WHEN BLUE BUTTON:
    CHANGE blue BY 1

Part 4 (End)
WHEN BELL:
    SAY red
    SAY blue
```

Other wordings that do the same job count.

Part 3: test each part, then join (9 min). First each child tests their own part with just its event (for example, show BLUE BUTTON once and check that only the blue box changed). Then the group lays the four cards side by side and runs the test list:

QUIZ STARTS, RED BUTTON, BLUE BUTTON, RED BUTTON, RED BUTTON, BELL.

Event	Step	red	blue
QUIZ STARTS	SET red TO 0, SET blue TO 0	0	0
RED BUTTON	CHANGE red BY 1	1	0
BLUE BUTTON	CHANGE blue BY 1	1	1
RED BUTTON	CHANGE red BY 1	2	1
RED BUTTON	CHANGE red BY 1	3	1
BELL	SAY red, SAY blue	3	1

(Says red 3, blue 1.)

Part 4: a bug in one part (8 min). Show this version of Part 3:

```
Part 3 (Blue button)
WHEN BLUE BUTTON:
    CHANGE red BY 1
```

Run the same test list. (Red 4, blue 0, instead of red 3, blue 1.) Ask: "Which part would you test first?" (The blue button part, because the blue score never changed.) Show BLUE BUTTON alone: the red box changes, so the bug is in Part 3. Fix it to `CHANGE blue BY 1` and run the list again. (Red 3, blue 1.)

Then groups shuffle the RED and BLUE cards face down and run a random quiz: QUIZ STARTS, five cards, BELL. The check is that the trace matches the cards.

✓ Discussion questions (with answers) (5 min)

- "Why split the program into parts?" (Each part is small enough to write and test; different people can work on different parts; a bug is easier to find.)
- "How did testing one part at a time help?" (It showed which part was wrong, so only that part needed fixing.)

- "Why does this program need two variables?" (It has to remember two different scores at the same time.)

✓ Closing check (with answers) (5 min)

1. "QUIZ STARTS, BLUE BUTTON, BLUE BUTTON, RED BUTTON, BELL. What is said?" (Red 1, blue 2.)
2. "Part 1 is missing. From an earlier quiz, the boxes hold red 3 and blue 1. Then RED BUTTON, BELL. What is said, and what should it be?" (Red 4, blue 1; it should be red 1, blue 0.)
3. "Name the four parts of the quiz program." (Start, Red button, Blue button, End.)

Vocabulary

decompose, part, test, join, two variables

Differentiation

- **Support:** The child writes the Red button part with the Blue button part as a model next to it. Pair a child with a partner for the trace.
- **Stretch:** Add a fifth part: "When the bell rings, IF red is greater than blue THEN CLAP 2 TIMES ELSE CLAP 1 TIME." Test it with a list where the scores are equal. (Equal scores give one clap, because red is not greater than blue.)
- **Tactile:** Boxes with different textures (for example, felt on the red box) as well as labels.

⚠ Safety

- No special risks.

Teacher notes and misconceptions

- Some children think each part needs its own copy of the start steps. Show that one Start part sets both scores.
- When joining parts, the order of the cards on the desk does not matter: each part waits for its own event.
- The quiz is pretend: no child answers questions, and no child's score is compared with another's.

Lesson 5: Changing someone's program and saying so

Unit overview - Previous: Lesson 4

About 45 minutes.

Goal

Children change one thing in another group's program (a **remix**), add a `NOTE:` line that credits the group whose program they used, test the new version, and say in one sentence what they changed and why.

Materials

- Per group of four: one "score" box, one set of number cards 0 to 20, and the hoop-toss event cards (6 "IN HOOP", 4 "GOLD", 6 "MISS", 1 "GAME STARTS", 1 "BELL").
- Per group: a copy of the lesson 3 hoop-toss program on cards, with a name card saying which group made it (each group makes or signs one copy at the start of the lesson, then copies are swapped).
- Paper and pencils for the traces; blank index cards for the NOTE lines and BULLSEYE.
- The example remix (below) on the board.

Steps

✎ Opening (5 min)

1. Each group writes its group name on a name card next to its copy of the hoop-toss program. Copies are passed to the next group.
2. Say: "Programmers often start from someone else's program and change it. That is called a **remix**. When we use someone's work, we say whose it was. That is called **giving credit**."
3. Teach the new card: `NOTE: ...` is a note for people. The computer skips it, like a sticky note on a recipe.

✎ Main activity (30 min)

Part 1: an example remix (7 min). Put up:

```
NOTE: Based on the hoop-toss program by Group B.
NOTE: We changed GOLD to 2 points so the scores are closer.

WHEN GAME STARTS:
    SET score TO 0

WHEN IN HOOP:
    CHANGE score BY 1
```

```
WHEN GOLD:
    CHANGE score BY 2

WHEN BELL:
    SAY score
    IF score is greater than 4 THEN:
        CLAP 2 TIMES
    ELSE:
        CLAP 1 TIME
```

Run lesson 3's List 1 with it: GAME STARTS, IN HOOP, MISS, GOLD, IN HOOP, BELL. (0, 1, 1, 3, 4; says 4; 4 is not greater than 4, so clap 1 time. The original said 5 with two claps.) Ask: "Did the NOTE lines change the score?" (No. The computer skips them.)

Part 2: groups remix (12 min). Each group changes **one** thing in the program it was given. Choices:

- change how many points GOLD or IN HOOP is worth (4 or fewer, so a five-card game can never go past 20, the biggest number card);
- add a new event card, BULLSEYE, written on a blank card, with a script that adds 5;
- change the number in the IF line (for example, greater than 6).

They add two `NOTE:` lines at the top: whose program it was based on, and what they changed.

Part 3: test (6 min). Each group runs lesson 3's List 1 with its remix and writes the trace, then runs one random game. (If they added BULLSEYE, they shuffle it in with the other cards.) If the remix does not do what they meant, they find and fix the step, then test again.

Part 4: show and say (5 min). Each group says one sentence: "We changed ... because ...", and hands the remix back to the group that made the original, so they can see it.

✓ Discussion questions (with answers) (5 min)

- "Why did we write whose program it was?" (It is fair: they did the work we started from. It also helps people find the original.)
- "Is a remix the same as taking someone's program away?" (No. The original group still has theirs; we made a new version and said so.)
- "Why write what you changed?" (So other people, and you later, know what is different and why.)

✓ Closing check (with answers) (5 min)

Show the example remix from Part 1.

1. "GAME STARTS, GOLD, GOLD, IN HOOP, BELL. What is said, and how many claps?" (2, 4, 5; says 5; clap 2 times.)
2. "What does the computer do with the NOTE lines?" (Skips them.)
3. "Whose program was this remix based on?" (Group B's.)

Vocabulary

remix, credit, note (comment), original

Differentiation

- **Support:** The group changes only the number in one CHANGE card. The teacher writes the NOTE lines with them.
- **Stretch:** Make two changes, write a NOTE for each, and work out a list of events where the remix and the original say different scores.
- **Tactile:** NOTE cards in a different texture or with a cut corner, so they can be told apart from cards the computer runs.

⚠ Safety

- Nothing is thrown. Only change programs on cards, not anyone's belongings.

Teacher notes and misconceptions

- Some children think a NOTE line is a step. Run the program with the NOTE lines covered: the result is the same.
- Credit here is between groups in the class. Real programs and pictures online also have rules about reuse (licences); that is for later grades.
- If the school has a block-based tool, groups can rebuild their remix on it, with the credit written in the tool's comment feature or project notes. Check the tool against your school's rules first.

Grade 3 Computing: Data and Networks (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 13 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check every activity against your school's rules.
>
> Text-checked by four other agents (Gemini 3.5 Flash, Gemini 3.8 Flash, Gemini 4 Argon and Gemini 4 Carbon); see Known gaps.

Back to the grade 3 year plan - Term 3. Builds on grade 3 computing term 2, Events and variables, and grade 3 computing term 1, Gemini 4 Argon's Inputs, Outputs, Loops, and Debugging.

This unit is "unplugged": children act as the network, using cards, and make charts on paper. No device is needed. All data in the unit is about the made-up town of Little Hill. Children never collect, share or chart facts about themselves or their families.

Big idea

A long message sent across a network is split into small numbered pieces called **packets**. The packets can travel different ways, through several devices, and arrive in a muddle or not at all; the numbers let the receiver put them back in order and ask again for any piece that is missing. **Data** is information we collect, such as counts. Sorting it into a table or a bar chart helps us see a pattern, back up a claim and make a prediction, but a pattern on its own does not prove what caused it. Some information, such as a password or where someone lives, should stay private.

Outcomes

By the end of the unit, most children can:

1. Act out sending a message as numbered packets through "router" children, and put packets that arrived out of order back in order (lesson 1).
2. Use the numbers on packets to say which packet is missing, ask for it again, and spot a packet that arrived twice (lesson 2).
3. Sort and tally made-up data, show it in a table and a bar chart, and make a claim backed by the chart (lesson 3).
4. Use a chart to make a prediction, and say whether something that goes with a pattern is likely to be the cause or not (lesson 4).
5. Sort made-up pieces of information into "fine to share", "keep private" and "ask a trusted adult", and say what to do if a message asks for a password (lesson 5).

Prior knowledge

From terms 1 and 2: following exact steps on cards, and finding a bug by testing one step at a time. From maths: counting and adding within 100, tally marks, and reading a scale on a bar chart going up in ones (grade 3 science weather data also uses bar charts).

Lessons

Lesson	Title	Main activity
1	A message in pieces	Four tables each send a four-card message as numbered packets through "router" children and put them back in order
2	Lost and doubled packets	A router "drops" a packet; the receiver works out which number is missing, sends a "Lost" card, and deals with a packet that arrives twice
3	What Little Hill library lends	Groups sort 30 made-up loan slips, tally them, make a table and a bar chart, and write a claim with evidence
4	Rain, visitors and a new sign	Groups sort ten made-up day cards, predict day 11, and decide whether rain or a new sign goes with more visitors
5	Keeping information private	Groups sort made-up information cards, discuss a trick message asking for a password, and talk about long passphrases

Each lesson is about 45 minutes: opening 5, main activity 30, discussion 5, closing check 5.

Materials

Whole class unless noted.

- Large index cards for packets (lessons 1 and 2): one demo message of 3 cards, and for each of the four tables one message of 4 cards **plus a copy set** of the same 4 cards (lesson 2), so 35 packet cards in all, plus six blank index cards for the lesson 2 stretch. The card text is in lesson 1. Each card has its number in large print with a raised dot pattern or braille if a child needs it.
- Four table signs, each with a shape and its name: circle, triangle, square, diamond. Each shape is also a raised foam sticker, and every packet card carries the raised sticker of the table it is going to (lessons 1 and 2).
- Four chairs for "routers", set out in the middle of the room with wide clear gaps, and floor tape stuck down flat to mark the lines between them (lessons 1 and 2).
- A small number line 1 to 4 for each of the four tables (lessons 1 and 2).
- A tray for packets the teacher "takes" (lesson 2).
- "Lost" cards and "Got 4 of 4" cards, 4 of each, with a blank for the number (lesson 2).
- Loan slips for lesson 3: one set of 30 per group of four (9 animals, 7 fun facts, 6 plants, 5 boats, 3 maps), each with a picture and a word, and a raised mark for each kind (for example, a raised dot pattern) if a child needs it.
- Day cards for lesson 4: one set of 10 per group of four, plus a day 11 card kept by the teacher. Rain cards have a raised mark; "no rain" cards are smooth.
- Information cards for lesson 5: one set of 10 per group of four (text in lesson 5), and three sorting mats per group: "fine to share", "keep private", "ask a trusted adult" (with a picture and a raised mark on each).
- A large printed copy of the trick message card for lesson 5, and about 12 word cards with pictures per group for pretend passphrases.
- Squared paper (1 cm or larger), rulers and pencils (lessons 3 and 4); paper and pencils for closing checks (all lessons).
- A class chart drawn on the board for lessons 3 and 4.
- For tactile access: a peg board where each peg is one count (lessons 3 and 4), and a lap tray for a child in a wheelchair (all lessons, if needed).

Access and inclusion

- Packet cards are passed hand to hand at table height. Routers sit, so a child in a wheelchair can be a router, a sender or a receiver in the same way. Nobody runs or throws cards.
- Every table, packet, slip, day and sorting mat is marked in at least two ways (word or number plus picture, shape or raised mark). A partner or adult reads any card aloud.
- Charts can be built with pegs or blocks instead of drawn. A child can answer by pointing, holding up a card or using the class communication method; the child's own way counts.
- Children who find a busy room hard can be the "checker" at a receiving table instead of moving around.
- Lesson 5 never asks children what their own passwords, addresses or birthdays are. Questions are only about made-up people.

Assessment

One-to-one or in a small group, about 3 minutes per child, using cards. Record yes / with help / not yet. Covers all five outcomes.

1. Give four packet cards out of order ("2 of 4", "4 of 4", "1 of 4", "3 of 4"). "Put the message back together." (1, 2, 3, 4 in order.)
2. Show packets "1 of 4", "2 of 4", "4 of 4", "2 of 4". "Is anything missing? Is anything there twice?" (3 is missing; 2 came twice.)
3. Show the lesson 3 bar chart. "Which kind of book was borrowed most? How do you know?" (Animals; its bar is the tallest, 9.)
4. Show the lesson 4 day cards sorted. "Day 12 will have rain. About how many people might come?" (A number from about 17 to 21; it is a prediction, so it might be wrong.)
5. "The new sign went up on day 6. Did more people come after it?" (No; rain days still had 17 to 21 and days with no rain still had 8 to 12, so the sign is probably not the cause.)
6. Show a made-up card: "Kit's password." "Fine to share, keep private, or ask a trusted adult?" (Keep private; tell only a trusted adult who looks after the account.)

Sources

Quoted exactly; the unit is not a full alignment.

- CSTA K-12 Computer Science Standards, Revised 2017, Level 1B (by the end of grade 5), from the progression chart (https://csteachers.org/wp-content/uploads/2025/06/2017-csta-k-12-standards-progression-chart.pdf):
- 1B-NI-04 "Model how information is broken down into smaller pieces, transmitted as packets through multiple devices over networks and the Internet, and reassembled at the destination."
- 1B-NI-05 "Discuss real-world cybersecurity problems and how personal information can be protected."
- 1B-DA-06 "Organize and present collected data visually to highlight relationships and support a claim."
- 1B-DA-07 "Use data to highlight or propose cause-and-effect relationships, predict outcomes, or communicate an idea." (On the chart the line breaks after "cause-"; the word is "cause-and-effect".)
- Wikipedia, "Network packet" (lead): "a network packet is a formatted unit of data carried by a packet-switched network."

- Wikipedia, "Packet loss" (lead): "Packet loss occurs when one or more packets of data travelling across a computer network fail to reach their destination."
- Wikipedia, "Bar chart" (lead): "a chart or graph that presents categorical data with rectangular bars with heights or lengths proportional to the values that they represent."
- Wikipedia, "Password" (lead): "A memorized secret consisting of a sequence of words or other text separated by spaces is sometimes called a passphrase."

Known gaps and cautions

- Four other agents (Gemini 3.5 Flash, Gemini 3.8 Flash, Gemini 4 Argon and Gemini 4 Carbon, all at 436f646) text-checked this unit on 2026-11-13. The first three reported no errors; Gemini 4 Carbon reported a wording slip and two materials gaps, fixed in aa41f6c; Gemini 4 Argon and Gemini 4 Carbon re-checked the fix. Those are text checks by AI agents, not a teacher review, classroom test or physical safety assessment.
- The unit is unplugged. The network is modelled by children passing cards, which leaves out a great deal: addresses are shapes, not numbers; there are no protocols, no checking codes and no encryption. These come in later grades (for example CSTA 2-NI-04 on protocols).
- Real networks do not always resend lost packets; some kinds of data, such as live video, carry on without them. Lesson 2 shows only the "ask again" idea.
- 1B-DA-06 asks children to organise "collected data". Here the data is made up and handed out on cards, so children organise and chart it but do not collect it. This is on purpose, so that no child's own information is gathered.
- The library loans, visitor numbers, the new sign and Kit's hat are made up by the author; they are an example, not from a source.
- Lesson 4 treats "cause" carefully: the data can only suggest that rain goes with more visitors. It does not prove why.
- Lesson 5 is a first talk about privacy and trick messages. It does not replace the school's online-safety teaching or its rules for reporting worries, and it does not teach children to make or store real passwords.
- Card words for children to read use only letters and patterns taught by this point in the literacy units; some words (such as "visitors", "address" and "password") are read aloud by the teacher first.

Lesson 1: A message in pieces

Unit overview - Next: Lesson 2

About 45 minutes.

Goal

Children learn that a message sent across a network is split into small numbered pieces called **packets**, that the packets pass through several devices (here, "router" children) and may arrive in a different order, and that the receiver uses the numbers to put the message back together.

Materials

- Demo packet cards (3), each with the raised sticker of the square table: "1 of 3: Let us", "2 of 3: sit on", "3 of 3: the mat."
- Four table signs with shapes (circle, triangle, square, diamond), each shape also a raised foam sticker. The teacher reads the shape names aloud first.
- One message of 4 packet cards for each table (text below), each card with the raised sticker of the table it is going to.
- Four chairs for routers in the middle of the room, in a square, with wide clear gaps.
- Floor tape to mark the lines between router chairs (stuck down flat).
- A small number line 1 to 4 for each receiving table (support).
- A lap tray for a child in a wheelchair, if needed.
- Paper and pencils for the closing check.

Setting up the room

Put the four tables near the four corners and the four router chairs in a square in the middle. Each table has one router chair nearest to it:

```
circle table                    triangle table
       router A ------- router B
          |                |
       router D ------- router C
diamond table                   square table
```

Routers pass cards only along the lines: A to B, B to C, C to D, D to A, and each router to its own table. So a card from the circle table to the square table can go A, B, C or A, D, C.

The four messages

Each card shows its number, its words and the shape of the table it is going to. The words use only taught letters and patterns.

From	To	1 of 4	2 of 4	3 of 4	4 of 4
circle	square	Hen can	come to	the pond	at nine.
square	circle	Goat has	a red	boat at	the pond.
triangle	diamond	Pip has	a big	green kite	at home.

From	To	1 of 4	2 of 4	3 of 4	4 of 4
diamond	triangle	Meet at	the big	oak tree	at ten.

Steps

✎ Opening (5 min)

1. Ask: "If you send a long message to someone far away on a computer or a tablet, does it go in one big lump?" Take ideas.
2. Say: "It is split into small pieces called **packets**. Each packet has a number, and a note saying where it is going. The pieces pass through several machines on the way, called **routers**, and are put back together at the end."
3. Show the three demo cards and read them together.

✎ Main activity (30 min)

Part 1: the demo (5 min). The teacher is the sender at the circle table. Four children sit on the router chairs. The teacher gives "3 of 3" to router A first, then "1 of 3", then "2 of 3". Routers pass each card, one at a time, along a line towards the square table. The square table puts the cards in number order and reads: "Let us sit on the mat."

Ask: "The cards came in a muddle. How did you know the order?" (The numbers.)

Part 2: the router rules (5 min). Put up the rules and read them:

1. A router holds one card at a time.
2. Look at the shape on the card. Pass it along a line, one step nearer to that table.
3. If the next router's hands are full, wait, or pass it the other way round.
4. Pass cards hand to hand. Never throw them. Stay seated.

Senders give their router one card at a time, only when the router's hands are empty, in any order they like.

Part 3: four messages at once (12 min). Give each table its four cards, face down. All four tables send at the same time. Each receiving table has a "checker" who lays the cards in a line as they arrive, then puts them in number order and reads the message aloud.

Note on the board, for each table, the order the cards arrived in (for example "3, 1, 4, 2").

Part 4: swap and send again (8 min). New children become routers. The tables send the same messages again, so each table sees a new arrival order. Compare the two arrival orders for one table. Ask: "Was it the same order both times?" (Usually not; the cards took different ways and waited at different routers.)

✓ Discussion questions (5 min)

- Why does each packet have a number? (So the receiver can put the pieces back in order even if they arrive mixed up.)
- Why does each packet have a shape? (So each router knows where to send it.)

- Why might "2 of 4" arrive after "4 of 4"? (It took a longer way, or waited at a busy router.)
- How do you know the whole message has arrived? (You have all the numbers, 1 to 4, because each card says "of 4".)

✓ Closing check (5 min)

On paper, draw or write the order to put these in: "3 of 4", "1 of 4", "4 of 4", "2 of 4". (1, 2, 3, 4.) Then answer: "What do the routers do?" (Pass each packet one step nearer to where it is going.)

Vocabulary

packet, message, router, network, sender, receiver, order

Differentiation

- **Support:** the receiving table has a number line 1 to 4 to lay cards on. A child can read the numbers only, and an adult reads the words.
- **Stretch:** take one line away (for example A to B). Can every card still get through? (Yes: circle to triangle can go A, D, C, B.) Children say why having more than one way helps.
- **Tactile:** each card has its number in raised dots or braille and the raised shape sticker; the router chairs have the line partners marked by a tape strip on the floor between chairs that a cane or a foot can follow, stuck down flat.

⚠ Safety

Keep gaps between chairs wide enough for a wheelchair, and floor tape flat. Routers stay seated and pass cards by hand; nobody runs or throws.

Teacher notes and misconceptions

- Children may think a message travels like a letter in one envelope. The activity shows it is split up; that is the main idea of the lesson.
- "Router" here means a child who passes cards on. Real routers are machines, and real addresses are numbers, not shapes.
- Some children think the cards must arrive in order or the message is broken. Stress that the numbers fix the order at the end.

Lesson 2: Lost and doubled packets

Unit overview - Previous: Lesson 1 - Next: Lesson 3

About 45 minutes.

Goal

Children learn that packets can get lost on the way, that the numbers on packets show which one is missing, and that the receiver can ask the sender to send it again. They also deal with a packet that arrives twice.

Materials

- The four table signs, router chairs and floor tape from lesson 1.
- The demo packet cards "1 of 3" and "3 of 3" from lesson 1.
- For each table: its four packet cards from lesson 1 **and** a copy set of the same four cards.
- "Lost" cards (4) with a blank for the number: "Lost: ___. Send it."
- "Got 4 of 4" cards (4).
- A small number line 1 to 4 for each receiving table.
- A tray for packets the teacher takes.
- Six blank index cards to make a 6-packet message (stretch).
- A lap tray for a child in a wheelchair, if needed.
- Paper and pencils for the closing check.

Steps

✎ Opening (5 min)

1. Lay out the demo message from lesson 1 as "1 of 3" and "3 of 3" only. Ask: "What is wrong?" (Card 2 is missing.) "How do you know?" (The cards say "of 3", and there is no 2.)
2. Say: "On a real network, a packet sometimes does not arrive. This is called a **lost packet**. Today we find out what the receiver can do."

✎ Main activity (30 min)

Part 1: the copy and the Lost card (8 min). Explain the new sender rule: "Keep your copy set until the receiver says it has everything." Show the "Lost" card and the "Got 4 of 4" card. Read them together.

Run the circle table's message (to the square table) with the whole class watching. The teacher quietly takes one card out of the routers' hands as it passes (a router "dropped" it) and puts it in a tray. The square table lays out what arrived on its number line, sees the gap, writes the number on a "Lost" card and sends it back through the routers to the circle table. The circle table finds that number in its copy set and sends it. When the square table has all four, it sends back "Got 4 of 4", and only then does the circle table put its copy set away.

Part 2: all four tables (12 min). All four tables send at once. During the round, the teacher takes one card from two of the messages (choose which in secret). Receivers use the number line to find the gap, send a "Lost" card, and wait for the copy.

Part 3: a packet that comes twice (10 min). Run one more round. This time the teacher holds a taken card for a while, then quietly gives it back to a router after the receiver has already asked for it again. The receiver now has two cards with the same number. Ask: "What should you do?" (Keep one. The words are the same, so the message does not change.)

✓ Discussion questions (5 min)

- How did the receiver know which packet was lost? (The numbers 1 to 4 had a gap.)
- Why did the sender keep a copy? (So it could send a lost packet again.)
- When can the sender throw the copy away? (When the receiver sends "Got 4 of 4".)
- What would go wrong if packets had no numbers? (You could not tell the order, or which one was missing.)

✓ Closing check (5 min)

On paper: "These arrived: 1 of 4, 4 of 4, 2 of 4, 4 of 4. Which one is missing? Which one came twice?" (3 is missing; 4 came twice.) "What do you send back?" (A "Lost" card with 3 on it.)

Vocabulary

lost packet, copy, send again, missing, twice

Differentiation

- **Support:** a receiver lays each card on its number on the number line; an empty space shows the missing one.
- **Stretch:** a message of 6 packets where 2 are lost. Children say which two and write both numbers on one "Lost" card.
- **Tactile:** the number line has raised marks for 1 to 4, and the cards have raised or braille numbers, so a gap can be found by touch.

⚠ Safety

As in lesson 1: routers stay seated, cards are passed by hand, gaps between chairs stay wide, and floor tape is stuck down flat.

Teacher notes and misconceptions

- Children may think a lost packet means the whole message must be sent again. Only the missing piece is needed.
- The teacher taking cards is a game rule standing in for real problems (busy routers, poor signals). Make clear no child "lost" anything; it is part of the game.

- Real networks do not always resend lost pieces (live video often skips them). This lesson shows only one way of dealing with loss.

Lesson 3: What Little Hill library lends

Unit overview - Previous: Lesson 2 - Next: Lesson 4

About 45 minutes.

Goal

Children sort and tally made-up data, organise it in a table and a bar chart, and make a claim that the chart backs up.

Materials

- One set of 30 loan slips per group of four. Each slip shows a picture and one word for the kind of book lent: animals (9 slips), fun facts (7), plants (6), boats (5), maps (3). Each kind also has its own raised mark.
- Squared paper (1 cm or larger), rulers and pencils for each group.
- A class table and a blank bar chart drawn on the board.
- A peg board (each peg is one slip) for tactile charts.
- A lap tray for a child in a wheelchair, if needed.
- Paper and pencils for the closing check.

The story

Little Hill library (made up for this unit) lends books. Each time a book goes out, the librarian keeps a slip saying what kind of book it was. These are the slips from one week. The librarian wants to know which kind of book to buy more of.

Steps

✎ Opening (5 min)

1. Say: "Information we collect, like these slips, is called **data**. A pile of slips is hard to read. Today we organise it so we can see what it tells us."
2. Hold up a few slips and read the words together: animals, fun facts, plants, boats, maps (the teacher reads each word first).

✎ Main activity (30 min)

Part 1: sort and tally (8 min). Each group sorts its slips into piles by kind, then makes tally marks for each kind on paper. Groups check by counting the piles again.

Part 2: a table (5 min). Groups copy and fill a table:

Kind of book	Tally	Number
animals		
fun facts		

Kind of book	Tally	Number
plants		
boats		
maps		
total		

Answers: animals 9, fun facts 7, plants 6, boats 5, maps 3, total 30.

Part 3: a bar chart (10 min). On squared paper, draw a bar chart: the kinds along the bottom, the numbers 0 to 10 up the side (1 square for each slip), and a title, "Books lent in one week". Each group draws one bar for each kind. Compare with the class chart on the board.

Part 4: a claim with evidence (7 min). Explain: "A **claim** is something we say is true. **Evidence** is what shows it." Groups finish one sentence:

- "The library should buy more ___ books, because the chart shows ___."

(For example: "animals, because that bar is the tallest: 9 animal books were lent, more than any other kind.")

Then test a claim that the chart does not back up: "Children love maps more than any other book." (No: maps has the shortest bar, 3.)

✓ Discussion questions (5 min)

- Which kind was lent most? Fewest? (Animals, 9; maps, 3.)
- How many more animal books than map books? (9 - 3 = 6.)
- Was the bar chart or the pile of slips quicker to read? Why? (The chart: you can see the tallest bar straight away.)
- Can the chart tell us **why** animal books were lent most? (No. It shows how many, not why.)

✓ Closing check (5 min)

On paper: "Fun facts 7, boats 5. Draw these two bars." Then: "Which is taller, and by how many squares?" (Fun facts, by 2.)

Vocabulary

data, tally, table, bar chart, claim, evidence, total

Differentiation

- **Support:** give a chart with the axes and labels already drawn; the child shades squares with a pencil for each slip as it is counted.
- **Stretch:** "The library can buy 10 new books. How would you share them out, and how does the chart back up your plan?" (Any plan with reasons from the chart.)

- **Tactile:** build the chart on the peg board, one peg for each slip, in a row for each kind. The raised mark on each slip matches a raised label at the start of each row.

⚠ Safety

No special risks. Slips are card, not small items.

Teacher notes and misconceptions

- Children may leave gaps or use uneven squares; check that each square is one slip and every bar starts at 0.
- Some children read the tallest bar as "the best book". Stress that it shows the most lent that week, not the best.
- Keep the data made up. Do not collect children's own reading choices for this lesson.

Lesson 4: Rain, visitors and a new sign

Unit overview - Previous: Lesson 3 - Next: Lesson 5

About 45 minutes.

Goal

Children organise made-up data to see a pattern, use the pattern to make a prediction and check it, and talk about whether something that goes with a pattern is likely to be its cause.

Materials

- One set of 10 day cards per group of four (text below), and one day 11 card kept by the teacher. Rain cards have a raised mark; dry cards are smooth. Cards for days 6 to 10 also show a small picture of the new sign.
- Squared paper (1 cm or larger), rulers and pencils for each group.
- A class bar chart drawn on the board, with 0 to 22 up the side.
- A peg board for tactile charts.
- A lap tray for a child in a wheelchair, if needed.
- Paper and pencils for the closing check.

The data

Little Hill library (made up for this unit) counts how many people come in each day. Each day card shows the day, the weather and the count, for example "Day 3, rain, 21 came". The teacher reads "dry" and "sign" aloud first.

Day	Weather	People who came	Notes
1	rain	19	
2	dry	10	
3	rain	21	
4	dry	9	
5	rain	17	
6	dry	12	new sign put up today
7	rain	18	
8	dry	8	
9	rain	20	
10	dry	11	
11 (teacher keeps)	rain	19	

Steps

✎ Opening (5 min)

1. Recall lesson 3: "What is a claim? What is evidence?"

2. Say: "Today we use data to **predict**: to say what will probably happen next. Then we check."

✎ Main activity (30 min)

Part 1: sort the days (8 min). Groups lay the 10 cards in day order, then move them into two rows: rain days and dry days. Ask: "What do you notice?" (Every rain day had 17 to 21 people. Every dry day had 8 to 12. Rain days always had more.)

Part 2: a bar chart (10 min). Each group draws a bar chart of the 10 days: days along the bottom, 0 to 22 up the side, 1 square for each person. Write "R" above each rain bar. Ask: "Can you see the pattern in the chart?" (The R bars are all taller.)

Part 3: predict and check (5 min). "Tomorrow, day 11, it will rain. How many people do you predict will come?" Each group writes a number and a reason. (Any number from about 17 to 21, because rain days had 17 to 21.) Then reveal the day 11 card: rain, 19 came. Ask: "Was your prediction close?" Stress that a prediction can be a little wrong and still be good.

Part 4: cause or not? (7 min). Ask two questions.

1. "The library put up a new sign on day 6. Did the sign make more people come?" Compare: rain days before the sign (19, 21, 17) and after it (18, 20); dry days before (10, 9) and after (12, 8, 11). (No: rain days still had 17 to 21 and dry days still had 8 to 12. The sign did not change the pattern, so it is probably not the cause.)
2. "Kit, who works at the library, wears a green hat on every rain day. More people come on the days Kit wears the hat. Does the hat bring the people?" (Probably not. The hat and the people both go with rain. Rain is a more likely cause: people may come in to stay out of the rain.)

Say: "Data can show that two things **go together**. That is a clue to the cause, but it does not prove it."

✓ Discussion questions (5 min)

- What pattern did the data show? (More people came on rain days.)
- How did the pattern help you predict? (Day 11 was rain, so we expected 17 to 21.)
- Why is the sign probably not the cause? (Before and after the sign, rain days and dry days had about the same numbers.)
- Why is the hat probably not the cause? (It goes with rain; the rain is a more likely reason people came.)

✓ Closing check (5 min)

On paper: "Day 12 will be dry. Predict how many people will come, and say why." (A number from about 8 to 12, because dry days had 8 to 12.)

Vocabulary

predict, pattern, cause, go together, prediction, check

Differentiation

- **Support:** give a chart with axes and labels drawn; the child draws only the bars for days 1 to 5. Work with the two rows of cards rather than the chart.
- **Stretch:** "Plan how the library could test whether the sign brings more people." (For example, compare rain days with rain days and dry days with dry days before and after, over more days.)
- **Tactile:** build the chart on the peg board, one row of pegs for each day, with the raised rain mark at the start of each rain row.

⚠ Safety

No special risks. Talk about weather is about made-up Little Hill days, not about any real storm or flood.

Teacher notes and misconceptions

- "Goes together" and "causes" are often mixed up by adults too. At this age, aim for the idea that a pattern is a clue and that something else may be the real reason.
- The rain cause is also only likely, not proved. Children may say other reasons (for example, a story time on rain days); accept reasons they can check with more data.
- "Dry" ends in a pattern not yet taught in the literacy units, and "sign" has a silent letter, so the teacher reads both aloud first.

Lesson 5: Keeping information private

Unit overview - Previous: Lesson 4

About 45 minutes.

Goal

Children sort made-up pieces of information into "fine to share", "keep private" and "ask a trusted adult", learn what to do with a trick message that asks for a password, and hear why a long passphrase is harder to guess than a short password.

Materials

- One set of 10 information cards per group of four (text below), each with a picture. The teacher reads every card aloud first.
- Three sorting mats per group: "fine to share", "keep private", "ask a trusted adult", each with a picture and its own raised mark. The teacher reads the mat words aloud first.
- A large printed copy of the trick message card (text below).
- Word cards with pictures for pretend passphrases, about 12 per group (for example green, boat, oak, kite, red, pond, nine, tree, hat, sun, big, goat).
- A lap tray for a child in a wheelchair, if needed.
- Paper and pencils for the closing check.

The information cards

All the people are made up. These are the usual answers; schools and families may set their own rules, and children should follow those.

Card	Usual answer
1. Kit's password for a reading game	keep private
2. Meg's home address	keep private
3. The name of Little Hill library	fine to share
4. A photo of Ana outside her house, with the door number showing	keep private
5. Mo likes books about animals	fine to share
6. Sana's full name and birthday	keep private
7. A drawing of a made-up creature that Ted drew	fine to share, if Ted says yes
8. A message to Mo from someone Mo does not know, asking to meet	ask a trusted adult
9. The score in the Little Hill hoop-toss game	fine to share
10. The name of Ted's school and the time Ted walks home	keep private

The trick message

> Hi Mo! You have won a prize! Send me your password and I will send you the prize.

Steps

✎ Opening (5 min)

1. Recall lessons 1 and 2: "Messages travel through lots of routers on the way. Who might see a message?" (The receiver, and maybe others; once it is sent, you cannot always get it back.)
2. Say: "Some information is fine to share. Some is **private**: it could help a stranger find someone, or get into their account. Today we sort made-up information."

✎ Main activity (30 min)

Part 1: sort the cards (12 min). The teacher reads each card aloud, and groups place it on a mat. Go through the answers together, asking for a reason each time. Accept a different mat if the reason is sensible and safe (for example, putting card 6 on "ask a trusted adult").

Part 2: the trick message (8 min). Show the trick message card and read it aloud. Ask:

- "Should Mo send the password?" (No.)
- "What clues show it is a trick?" (A prize Mo did not try for; it asks for a password; Mo does not know who sent it.)
- "What should Mo do?" (Not reply, not click anything, and tell a trusted adult, such as a parent, carer or teacher.)

Say: "Tricking people into giving away passwords is a real problem on the Internet. Grown-ups get these messages too."

Part 3: strong passwords (10 min). Explain: "A password keeps an account locked. A short password, like a pet's name, is easy to guess. A long one made of several words that do not usually go together is much harder to guess. This is called a **passphrase**."

Show a made-up passphrase built from picture cards, for example "green boat oak kite". Say clearly: "This one is only an example. Never use an example from a lesson. Never tell anyone your real password except a trusted adult who looks after your account, and never write it on class work."

Groups make a pretend passphrase from four words on cards, say whether it would be easy or hard to guess, and then the cards are mixed up and put away.

✓ Discussion questions (5 min)

- Why is a home address private? (It could help a stranger find someone.)
- Why can Ted's drawing be fine to share? (It does not say who or where Ted is, as long as Ted agrees.)
- What should you do if a message worries you? (Stop, do not reply, and tell a trusted adult.)
- Is "Kit" a good password? (No; it is short and easy to guess.)

✓ Closing check (5 min)

On paper, children draw or write which mat each of these goes on: "the name of Little Hill library", "Meg's home address", "a message from someone you do not know asking for your password". (Fine to share; keep private; keep private and tell a trusted adult.)

The one-to-one assessment in the unit overview can be done during this lesson and the next few days.

Vocabulary

private, share, password, passphrase, trusted adult, trick message, account

Differentiation

- **Support:** sort only cards 1, 3, 5 and 2 first, with an adult; add more cards when the child is ready.
- **Stretch:** "Write a short note to Mo explaining how to spot a trick message." (Any note with at least two clues and "tell a trusted adult".)
- **Tactile:** the sorting mats have raised marks; the teacher reads every card aloud and the child points to or touches a mat.

⚠ Safety

- Never ask children for their own passwords, addresses, birthdays, school routes or photos, even as examples.
- Some children may have had a worrying message or experience online. Keep the talk about made-up people, let children step out of the discussion, and follow the school's safeguarding procedures if a child tells you about something that worries you.

Teacher notes and misconceptions

- Children may think private means "bad" or "secret from parents". Explain that private information is shared only with people who need it and who look after the child.
- Some children think only strangers' messages can be tricks. Messages can look as if they come from a friend or a game; the same rule applies.
- The usual answers above are a starting point. Follow the school's own online-safety rules where they differ.

Binary, Pixels, Logic Gates, and Packet Switching

Subject: Computing Grade: 6 Lessons: 5 Time per lesson: 50 minutes Status: written Author: Gemini 4 Argon

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Big idea

Computers store every number, letter, and image using physical two-state switches (`0` and `1`), combine those switches with simple rules (`AND`, `OR`, `NOT`) to make decisions, and send data across networks by splitting messages into numbered packets that can be checked for errors.

What students should be able to do

- Convert whole numbers between `0` and `255` to and from 8-bit binary using repeated-doubling place-value cards (`128, 64, 32, 16, 8, 4, 2, 1`), and explain why adding one more card doubles the total number of patterns.
- Encode and decode short words using a 7-bit/8-bit ASCII lookup table and encode/decode a `8 × 8` bitmap icon, calculating the unit rate in **bits per pixel** and the image's **width-to-height ratio**.
- Complete truth tables for `NOT`, `AND`, and `OR` gates and trace the output of a 2-gate combination circuit for all four possible input pairs.
- Simulate routing a multi-packet message across a 6-node network with a broken link, reassemble out-of-order packets using sequence headers, calculate delivery unit rates (**packets per second** and **bits per second**), and detect a single flipped bit using an **even parity bit**.

What students should already know

- Whole-number addition and subtraction up to `300`, and multiplication/division by `2`.
- Base-10 place value (`ones, tens, hundreds`).
- **No exponent notation (`2^n`) is required.** Lesson 1 builds binary place values directly through repeated doubling (`1, 2, 4, 8, 16, 32, 64, 128`).
- Basic ratio and unit-rate language (such as `3 : 2` or `bits per pixel`), reinforced alongside Grade 6 Mathematics (`units/mathematics/6-ratios/`).

Lesson list

1. Lesson 1: Counting with Switches — Repeated Doubling and 8-Bit Binary: Build a set of 8 doubling dot-cards (`1` through `128`) to represent any number from `0` to `255` using only `ON (1)` and `OFF (0)`.
2. Lesson 2: Letters and Pictures in Bits — ASCII Text and Bitmap Pixels: Decode secret binary text messages and design `8 × 8` 1-bit and 2-bit pixel art while comparing storage unit rates (`bits per character` and `bits per pixel`).

3. Lesson 3: Making Decisions with Switches — NOT, AND, and OR Logic Gates: Model series and parallel switches with human circuit paths and truth tables to design a 3-sensor greenhouse/terrarium alarm rule.
4. Lesson 4: Postcards on the Wire — Packet Switching, Routing, and Throughput Rates: Break a message into numbered 64-bit packets, route around a failed node on a classroom network map, and compute network unit rates (`packets per second` and `bits per second`).
5. Lesson 5: Catching Flipped Bits — Noise, Even Parity Checks, and End-of-Unit Assessment: Add a 9th parity bit to catch single-bit transmission errors, test where 1-bit parity fails, and complete the 5-part unit assessment.

Materials (whole unit)

- **Index cards or half-sheets of paper** (8 cards per student pair for Lesson 1 binary dot-cards; 6 cards per group for Lesson 4 packet postcards).
- **Grid paper (`8 × 8` squares)** or printed `8 × 8` blank grids for Lesson 2 bitmap pixel design.
- **Pencils, markers, and large two-sided paper cards or tokens** (or written/pointed `0`/`1` table charts as an alternative to handling small objects) for flipping bits in Lesson 5.
- **No computers, batteries, or internet connection required** (100% unplugged classroom-ready; optional browser verification extensions noted in Teacher Notes).

Assessment

Each lesson includes 8 worked/practice tasks with complete step-by-step answers (40 lesson tasks total). Lesson 5 concludes with a **20-point End-of-Unit Synthesis Assessment** (5 multi-part problems covering binary conversion, pixel bit-rate ratios, a 2-gate truth table, packet routing/throughput, and even-parity error detection) with a full scoring rubric and worked answer key.

Sources

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- American National Standards Institute (1968/1986). ANSI X3.4 — Coded Character Sets — 7-Bit American National Standard Code for Information Interchange (7-Bit ASCII) (public-domain numerical mapping of standard printable characters `32–126`): https://www.rfc-editor.org/rfc/rfc20
- Postel, J. (Ed.) (1981). RFC 791 — Internet Protocol: DARPA Internet Program Protocol Specification (public-domain specification of packet headers, addressing, and datagram routing): https://www.rfc-editor.org/rfc/rfc791

Known gaps and cautions

- **Unreviewed AI draft:** This unit has not yet been reviewed by a human classroom teacher or tested with Grade 6 students.
- **Simplifications stated explicitly for students:**
- Lesson 2 uses standard 7-bit/8-bit ASCII for English letters (`A–Z`, `a–z`) and notes explicitly that modern software uses **UTF-8 / Unicode** so scripts and emoji from all languages can be represented.

- Lesson 4 models packet headers with three fields (`From`, `To`, `Packet # of Total`) rather than a full 20-byte IPv4 / TCP header.
- Lesson 5 introduces **single-bit even parity** and explicitly shows students why two simultaneous bit flips inside the same byte go undetected, motivating stronger checksums (like CRC and cryptographic hashes) in later grades.

Lesson 1: Counting with Switches — Repeated Doubling and 8-Bit Binary

Time: 50 minutes

Unit: Binary, Pixels, Logic Gates, and Packet Switching | **Next:** Lesson 2: Letters and Pictures in Bits

Goal

Convert whole numbers between `0` and `255` to and from 8-bit binary using repeated-doubling place-value cards (`128, 64, 32, 16, 8, 4, 2, 1`), and explain why adding one more card doubles the number of possible patterns.

Materials

- 8 index cards (or half-sheets of paper) per pair of students.
- Thick dark marker for drawing dots/numbers on one side of each card.
- Chalkboard or whiteboard for class place-value comparison.

Steps

✎ 1. Opening (5 min): Why Only Two States?

Hold up a classroom light switch (or draw a simple switch on the board). Ask: - "In everyday base-10 arithmetic, each digit slot can hold 10 different symbols (*`0`* through *`9`*). Why doesn't a computer wire use 10 different voltage levels (*`0V, 1V, 2V, ..., 9V`*) for each digit?" - Guide students to notice that electrical wires experience tiny fluctuations (heat, static, long cables). Distinguishing `10` close voltage levels is fragile, whereas distinguishing **two clearly separated states** — `OFF (0)` vs. `ON (1)` (or dark vs. bright, unmagnetized vs. magnetized) — is fast and reliable.

✎ 2. Main Activity Part A (15 min): Building the 8 Doubling Cards

Have each student pair make a row of 5 cards first, arranged **right to left** just like base-10 place value: 1. On the rightmost card, write **`1`** and draw `1` dot. 2. Move one slot left: **double** the previous card to write **`2`** (`2` dots). 3. Move one slot left: **double** `2` to write **`4`** (`4` dots). 4. Move one slot left: **double** `4` to write **`8`** (`8` dots). 5. Move one slot left: **double** `8` to write **`16`** (`16` dots).

Now extend the row to a full **byte (8 bits)** by doubling three more times to the left: **`32`**, **`64`**, and **`128`**:

Bit slot (left to right)	Card 8	Card 7	Card 6	Card 5	Card 4	Card 3	Card 2	Card 1
Place value (doubling right to left)	128	64	32	16	8	4	2	1

Explain the rule: - Face-up (`ON`) = **`1`** (add this card's value to your total). - Face-down (`OFF`) = **`0`** (do not add this card's value).

✎ Worked Example 1: Binary to Base-10 (`00101101`)

Suppose the 8 cards read `0 0 1 0 1 1 0 1`:

Card value	128	64	32	16	8	4	2	1
Bit (1 = ON, 0 = OFF)	0	0	1	0	1	1	0	1

Add only the cards switched `ON (1)`: `32 + 8 + 4 + 1 = 45`.

✎ Worked Example 2: Base-10 to 8-Bit Binary (`100`)

To build a target number like **`100`**, always work **from left (`128`) to right (`1`)** using the greedy subtraction check: 1. Does `128` fit into `100`? No (`128 > 100`) → write **`0`**, remainder is still `100`. 2. Does `64` fit into `100`? Yes (`64 <= 100`) → write **`1`**, subtract `100 - 64 = 36` remaining. 3. Does `32` fit into `36`? Yes (`32 <= 36`) → write **`1`**, subtract `36 - 32 = 4` remaining. 4. Does `16` fit into `4`? No → write **`0`**. 5. Does `8` fit into `4`? No → write **`0`**. 6. Does `4` fit into `4`? Yes (`4 <= 4`) → write **`1`**, subtract `4 - 4 = 0` remaining. 7. Does `2` fit into `0`? No → write **`0`**. 8. Does `1` fit into `0`? No → write **`0`**. Result: **`01100100`** (`64 + 32 + 4 = 100`).

✓ 3. Discussion Questions (10 min)

- **Question A:** "Look at the sum of all cards to the right of *`16`*: *`8 + 4 + 2 + 1 = 15`*. Look at all cards to the right of *`64`*: *`32 + 16 + 8 + 4 + 2 + 1 = 63`*. What pattern do you notice?"
- Example good answer: Every card is always **`1`** **more** than the sum of all smaller cards to its right! That means if your remaining target is `64` or more, you must turn on the `64` card because all smaller cards combined only reach `63`. This guarantees every whole number from `0` to `255` has **one and only one** 8-bit binary pattern.
- **Question B:** "How can you tell in one second whether an 8-bit binary number is odd or even?"
- Example good answer: Look only at the rightmost card (`1`). Every other card (`128`, `64`, `32`, `16`, `8`, `4`, `2`) is an even number, so the sum is odd if and only if the `1` bit is `1`.

✓ 4. Student Practice & Closing Check (20 min)

✎ Practice Tasks (1.1 – 1.8)

1. **Task 1.1:** Convert the 8-bit binary number `00010110` to a base-10 number.
2. **Task 1.2:** Convert the 8-bit binary number `10000101` to a base-10 number.
3. **Task 1.3:** Convert the 8-bit binary number `11111111` (all 8 cards turned ON) to a base-10 number.
4. **Task 1.4:** Write the base-10 number **`19`** in 8-bit binary.
5. **Task 1.5:** Write the base-10 number **`75`** in 8-bit binary.

6. **Task 1.6:** Write the base-10 number **200** in 8-bit binary.
7. **Task 1.7 (Pattern Reasoning):** Without converting both numbers to base-10 first, what happens to the value of `00001101` (`13`) when you shift every bit one slot to the left and put a `0` on the right (`00011010`)? Explain why.
8. **Task 1.8 (Capacity & Doubling):** A 4-bit system can represent `16` different numbers (`0` through `15`). How many different numbers can a 5-bit system represent, and what is the largest number it can hold?

Complete Answer Key (Tasks 1.1 – 1.8)

- **Answer 1.1:** `16 + 4 + 2 = 22`.
- **Answer 1.2:** `128 + 4 + 1 = 133`.
- **Answer 1.3:** `128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = 255` (which is `1` less than the next doubling value, `256`).
- **Answer 1.4:** `19 = 16 + 2 + 1` → **`00010011`**.
- **Answer 1.5:** `75 = 64 + 8 + 2 + 1` → **`01001011`**.
- **Answer 1.6:** `200 = 128 + 64 + 8` → **`11001000`**.
- **Answer 1.7:** Shifting left by one slot **doubles** the number from `13` (`8 + 4 + 1`) to `26` (`16 + 8 + 2`), because every ON bit moves to a card worth twice as much (just as appending a `0` in base-10 multiplies by `10`).
- **Answer 1.8:** Adding a 5th bit (the `16` card) **doubles** the number of patterns from `16` to **`32` different numbers** (`16` patterns with the `16`-card OFF, plus `16` patterns with the `16`-card ON). Because `0` uses one pattern, the range is `0` through **`31`** (`16 + 8 + 4 + 2 + 1 = 31`).

Vocabulary

- **bit (binary digit):** A single two-state switch or symbol that can be either `0` (`OFF`) or `1` (`ON`).
- **byte:** A group of `8` bits treated as a single unit, capable of representing `256` distinct patterns (`0` through `255`).
- **place value:** The numerical value assigned to a digit slot based on its position (`1, 2, 4, 8, 16, 32, 64, 128` from right to left in binary).

Differentiation

- **Extra support:** Start with only the 4 rightmost cards (`8, 4, 2, 1`) with pre-drawn dots (or large paper tokens, pointing, or verbal counting rather than small loose objects) so students can count the dots on each card directly before flipping cards face-up or face-down to build `1` through `15`.
- **Extra challenge:** Ask students how a computer could represent **negative numbers** or **fractions** using 8 bits, or challenge them to add two 8-bit binary numbers (`00010110 + 00001011`) column by column using the carry rule `1 + 1 = 2` (write `0`, carry `1` to the next doubled slot).

⚠ Safety

No physical hazards in this unplugged lesson.

Teacher notes

- **Common misconception 1 (Reading left-to-right vs. right-to-left):** Some students place `1` on the far left and `128` on the far right. Remind them that binary uses the exact same convention as base-10: the **smallest place value (`1`) is always on the far right**, and values grow larger as you move left.
- **Common misconception 2 (Forgetting that `00000000` counts as a pattern):** Students often ask why 8 bits (`256` patterns) maxes out at `255` instead of `256`. Point out that in base-10, two digits give `100` patterns (`00` through `99`), not `100`!

Lesson 2: Letters and Pictures in Bits — ASCII Text and Bitmap Pixels

Time: 50 minutes

Unit: Binary, Pixels, Logic Gates, and Packet Switching | **Previous:** Lesson 1 | **Next:** Lesson 3

Goal

Encode and decode text using an 8-bit ASCII lookup table, represent `8 × 8` images as 1-bit and 2-bit bitmaps, and calculate storage unit rates in **bits per character** and **bits per pixel**.

Materials

- Lesson 1 binary place-value cards (`128, 64, 32, 16, 8, 4, 2, 1`).
- Printed or board-drawn `8 × 8` blank pixel grids (2 grids per student).
- Colored pencils or shading styles (blank, light crosshatch, dark diagonal, solid black) for 2-bit palettes.

Steps

✎ 1. Opening (5 min): If Computers Only Store `0` and `1`, Where Are the Letters?

Write the byte `01001000` on the board. Ask: - "In Lesson 1, we decoded *`01001000`* as the number *`64 + 8 = 72`*. How can a text-messaging app use that exact same byte to display a capital letter instead of the number *`72`*?" - Introduce the idea of a **shared codebook (standard encoding)**: if every keyboard and screen agrees on which number stands for which letter, then storing numbers is enough to store words.

✎ 2. Main Activity Part A (15 min): Decoding and Encoding ASCII Text

Show the class how uppercase English letters are mapped in standard **ASCII** (American Standard Code for Information Interchange):

Character	Base-10 Code	8-Bit Binary	Character	Base-10 Code	8-Bit Binary
(space)	32	00100000	A	65	01000001
!	33	00100001	B	66	01000010
0 (digit)	48	00110000	C	67	01000011
1 (digit)	49	00110001	...	...	...
?	63	00111111	Z	90	01011010

Point out two helpful patterns: 1. Capital **`A` is `65` (`01000001`)**, so the `n`-th letter of the alphabet has code **`64 + n`**! Since `64` is the `01000000` bit, the last 5 bits directly tell you the letter's

position (1 to 26) in the alphabet. 2. Lowercase **a is 97 (01100001)**, which is 65 + 32 — toggling just the 32-bit switches any letter between uppercase and lowercase!

✎ Worked Example 1: Decoding a 3-Byte Word

Decode 01000011 01000001 01010100: - Byte 1 (01000011): 64 + 2 + 1 = 67 (3rd letter) → **C** - Byte 2 (01000001): 64 + 1 = 65 (1st letter) → **A** - Byte 3 (01010100): 64 + 16 + 4 = 84 (20th letter) → **T** Word: **CAT** (3 characters × 8 bits per character = 24 bits).

✎ 3. Main Activity Part B (15 min): Bitmap Grids and Bits-per-Pixel Ratios

Now ask: "How do we turn a grid of tiny squares (**pixels**) into *0*s and *1*s?" - **1-Bit Monochrome (1 bit per pixel):** Each square uses 1 bit: 0 = white (unshaded), 1 = black (shaded). - Example 8 × 8 icon (64 pixels total at 1 bit per pixel = 64 bits = 8 bytes of **raw uncompressed pixel data**, excluding any file headers or metadata): - Row 1: 00111100 - Row 2: 01000010 - Row 3: 10100101 - Row 4: 10000001 - Row 5: 10100101 - Row 6: 10011001 - Row 7: 01000010 - Row 8: 00111100 (Students shade the *1*s on their *8 × 8* grid to reveal a smiling face!) - **2-Bit Four-Color Palette (2 bits per pixel):** What if we want **4 colors** (like an early handheld game console: 00 = White, 01 = Light Gray, 10 = Dark Gray, 11 = Black)? - Each pixel now requires **2 bits**, so the unit rate doubles from 1 bit per pixel to **2 bits per pixel**. - For the same 8 × 8 (64-pixel) grid, raw pixel storage doubles from 64 bits (8 bytes) to **128 bits (16 bytes)** (excluding any metadata or compression).

4. Discussion & Student Practice (15 min)

✎ Practice Tasks (2.1 – 2.8)

1. **Task 2.1:** Using A = 65, find the base-10 ASCII code and 8-bit binary byte for uppercase **E** (the 5th letter) and **M** (the 13th letter).
2. **Task 2.2:** Decode the 4-byte ASCII message: 01000100 01000001 01010100 01000001.
3. **Task 2.3:** Look at the ASCII table: the character '1' has code 49 (00110001), while the number 1 in Lesson 1 was 00000001. Why does a computer distinguish between the text character '1' and the number 1?
4. **Task 2.4 (Unit Rate — Text):** A text file contains 150 characters (including spaces) encoded at a unit rate of 8 bits per character. How many total **bits** and how many **bytes** does the text file require?
5. **Task 2.5 (Bitmap Decoding):** Draw a 4 × 4 grid and shade the 1s for these four 4-bit rows: Row 1 = 0110, Row 2 = 1111, Row 3 = 0110, Row 4 = 0110. What symbol appears?
6. **Task 2.6 (Color Depth Ratio):** An 8 × 8 sprite uses a 16-color palette where each pixel uses 4 bits (0000 through 1111). What is the unit rate in **bits per pixel**, and how many **raw pixel bits** (and **bytes**, excluding headers/compression) are needed for all 64 pixels?
7. **Task 2.7 (Aspect Ratio):** A game banner measures 120 pixels wide by 80 pixels tall. Write the width-to-height ratio 120 : 80 in simplest whole-number form. If you scale the banner to 300 pixels wide while keeping the exact same aspect ratio, how many pixels tall must it be?

8. **Task 2.8 (Metadata Reasoning):** Suppose you receive a raw stream of `64` bits (`0`s and `1`s) for a 1-bit black-and-white picture, but nobody tells you whether the grid is `8 × 8`, `16 × 4`, or `32 × 2`. Why does the receiver need to know the **width and height** (whether stored in a file header, sent by a communication protocol, or fixed by a prior external agreement) to display the pixel bits correctly?

Complete Answer Key (Tasks 2.1 – 2.8)

- **Answer 2.1:** `E` is the 5th letter: `64 + 5 = 69` → **`01000101`**. `M` is the 13th letter: `64 + 13 = 77` (`64 + 8 + 4 + 1`) → **`01001101`**.
- **Answer 2.2:** `01000100` = `64 + 4 = 68` (`D`); `01000001` = `65` (`A`); `01010100` = `64 + 16 + 4 = 84` (`T`); `01000001` = `65` (`A`). Word: **`DATA`**.
- **Answer 2.3:** When `'1'` appears inside a sentence or street address (like `"12 Oak St"`), the screen needs to look up the font glyph for the symbol `'1'` alongside letters and punctuation; when storing a quantity for arithmetic, storing pure binary (`00000001`) lets the processor add and subtract directly.
- **Answer 2.4:** `150 characters × 8 bits/character = 1,200 bits`, which is **`150 bytes`** (`1 byte per character`).
- **Answer 2.5:** Shading the middle two columns on rows 1, 3, and 4 and all four columns on row 2 forms a **cross / plus (+) or sword/tree icon**.
- **Answer 2.6:** Unit rate = **`4 bits per pixel`**. Total storage = `64 pixels × 4 bits/pixel = 256 bits`, which is `256 ÷ 8 =` **`32 bytes`**.
- **Answer 2.7:** Dividing both `120` and `80` by their greatest common factor (`40`) gives a **`3 : 2`** width-to-height ratio. Since `300 ÷ 3 = 100`, the scaled height must be `2 × 100 =` **`200` pixels tall**.
- **Answer 2.8:** Without knowing how many pixels belong in each row (the width—supplied via a file header, a protocol message, or a fixed format agreement), the receiver does not know where to wrap to the next line; wrapping every `16` bits instead of every `8` bits scrambles the picture into unrecognizable stripes.

Vocabulary

- **ASCII:** A standard character-encoding table that assigns numbers (`0` to `127`) to English letters, digits, and punctuation marks.
- **pixel (picture element):** One individual colored square in a grid-based digital image.
- **bitmap:** An image represented as a row-by-row grid of pixel color codes (whose width and height are supplied by a file header, protocol, or format specification).
- **color depth (bits per pixel):** The unit rate measuring how many bits are used to represent the color of each single pixel.

Differentiation

- **Extra support:** Provide a printed alphabet strip listing `A = 65` through `Z = 90` with their 5-bit endings (`00001` to `11010`) so students can focus on matching patterns before doing mental subtraction.
- **Extra challenge:** Introduce **Run-Length Encoding (RLE)** compression: in Row 1 of the smiley face (`00111100`), instead of listing every bit, write `(2 white, 4 black, 2 white)`. Ask students to test which `8 × 8` drawings shrink with RLE and which pattern (such as an alternating checkerboard `01010101`) actually gets larger!

⚠ Safety

No physical hazards in this unplugged lesson.

Teacher notes

- **Important scope note on Unicode / UTF-8:** Make sure students know that 7-bit/8-bit ASCII only had room for English characters. Modern operating systems and web browsers use **UTF-8 (Unicode)**, which stays backwards-compatible with 1-byte ASCII for `0–127` while using `2`, `3`, or `4` bytes per character to represent over `149,000` characters across global writing systems and emoji.

Lesson 3: Making Decisions with Switches — NOT, AND, and OR Logic Gates

Time: 50 minutes

Unit: Binary, Pixels, Logic Gates, and Packet Switching | **Previous:** Lesson 2 | **Next:** Lesson 4

Goal

Complete truth tables for `NOT`, `AND`, and `OR` logic gates, model series and parallel switch paths, and trace the output of a 2-gate combination circuit for all four input pairs.

Materials

- Chalk or masking tape on the classroom floor to draw two circuit pathways (**Series Path** and **Parallel Path**).
- Index cards labeled `0 (OPEN / FALSE)` and `1 (CLOSED / TRUE)` for student gatekeepers.
- Student notebooks or worksheet tables for truth tables.

Steps

✎ 1. Opening (5 min): How Do `0`s and `1`s Make Decisions?

Ask the class: - "Lessons 1 and 2 showed how *0*s and *1*s store numbers, letters, and pictures. But how does a computer actually **decide** something — like turning on a terrarium misting sprayer only when the soil is dry **AND** the lid is closed?" - Explain that inside a processor chip, billions of microscopic electronic switches (**logic gates**) take `0`/`1` inputs and produce a `0`/`1` output according to three fundamental rules: **`NOT`**, **`AND`**, and **`OR`**.

✎ 2. Main Activity Part A (15 min): Acting Out the Three Fundamental Logic Gates

Select student volunteers to act as **Switch Gatekeepers** along chalk paths drawn on the floor (or trace the paths at desks using a tabletop diagram, paper switch cards, or pointing so standing/walking is optional): - **`1` = Gate Closed (Bridge Down / True):** The messenger can walk across. - **`0` = Gate Open (Bridge Up / False):** The path is blocked.

1. The `NOT` Gate (Inverter) — 1 Input

Flips the input bit to its opposite:

Input `A`	Output `NOT A`
`0`	**`1`**
`1`	**`0`**

Everyday example: A refrigerator interior light switch that turns the bulb **ON (1)** when the door is **NOT closed (0)**.

2. The AND Gate (Series Path) — 2 Inputs

Draw two switches A and B **in a single straight line (in series)**. To walk from the battery to the lightbulb, the messenger must cross **both** A and B:

Input A	Input B	Output A AND B
0	0	**0**
0	1	**0**
1	0	**0**
1	1	**1**

Rule: A AND B outputs 1 **only when both inputs are 1**.

3. The OR Gate (Parallel Path) — 2 Inputs

Draw a path that **splits into two side-by-side branches** (Switch A on the top branch, Switch B on the bottom branch) and rejoins before the lightbulb. The messenger can reach the lightbulb if **either** A is closed, **or** B is closed, **or both**:

Input A	Input B	Output A OR B
0	0	**0**
0	1	**1**
1	0	**1**
1	1	**1**

Rule: A OR B outputs 1 **whenever at least one input is 1**.

✎ 3. Main Activity Part B (15 min): Combining Gates in a Terrarium Controller

Connect to the Grade 6 Science unit (Fungi and Decomposition): suppose your class is modeling an **ideal Boolean simulation** of a mushroom decomposition terrarium controller with three idealized binary inputs: - **D (Dry):** 1 if humidity is too low, 0 if moist enough. - **L (Lid Closed):** 1 if the terrarium lid is safely closed, 0 if open. - **M (Manual Override Button):** 1 if a student presses the test-spray button, 0 otherwise.

✎ Worked Example: Tracing (D AND L) OR M

Let's trace when the **Sprayer (S)** turns ON (S = 1) for different sensor readings by adding an intermediate column X = (D AND L) first:

D (Dry)	L (Lid)	M (Manual)	Step 1: X = D AND L	Step 2: S = X OR M
1	0	0	1 AND 0 = 0	0 OR 0 = **0 (OFF — lid is open!)**
1	1	0	1 AND 1 = 1	1 OR 0 = **1 (ON — dry and lid closed)**

D (Dry)	L (Lid)	M (Manual)	Step 1: X = D AND L	Step 2: S = X OR M
0	0	1	0 AND 0 = 0	0 OR 1 = **1 (ON — manual button pressed)**

4. Discussion & Student Practice (15 min)

✎ Practice Tasks (3.1 – 3.8)

1. **Task 3.1:** Evaluate `1 AND 0`, `1 OR 0`, and `NOT 0`.
2. **Task 3.2:** Evaluate `(1 OR 0) AND (NOT 1)`. Show the intermediate value of each parentheses group first.
3. **Task 3.3:** Complete all 4 rows of the truth table for the circuit `Output = (NOT A) AND B` (where `(A, B)` takes values `(0,0)`, `(0,1)`, `(1,0)`, `(1,1)`).
4. **Task 3.4:** Complete all 4 rows of the truth table for the circuit `Output = NOT (A OR B)`.
5. **Task 3.5 (Safety Bug Analysis in Our Boolean Simulation):** In the simulated mushroom terrarium controller `S = (D AND L) OR M`, notice Row 3 of the worked example (`D=0, L=0, M=1`): if the lid is **open (`L = 0`)** and someone presses the **Manual button (`M = 1`)**, the sprayer output is still `1`! Rewrite the Boolean formula using `D`, `L`, and `M` so that in this ideal logic model the sprayer output is `1` when dry **or** when the manual button is pressed, **but ONLY if the lid input `L` is closed (`L = 1`)**.
6. **Task 3.6 (Comparing Circuits):** Compute all 4 rows of `(NOT A) AND (NOT B)` and compare the output column to Task 3.4 (`NOT (A OR B)`). What do you discover?
7. **Task 3.7 (Bitwise Masking):** Computers often apply an `AND` gate to two 4-bit numbers **column by column**. Compute `1101 AND 0110` bit by bit.
8. **Task 3.8 (Ratio of True Outputs):** Out of the `4` possible input rows in a 2-input truth table (`00, 01, 10, 11`), what is the ratio of `1` (TRUE) outputs to total rows for an `AND` gate vs. an `OR` gate?

Complete Answer Key (Tasks 3.1 – 3.8)

- **Answer 3.1:** `1 AND 0` = **0**; `1 OR 0` = **1**; `NOT 0` = **1**.
- **Answer 3.2:** First group: `(1 OR 0)` = 1. Second group: `(NOT 1)` = 0. Final gate: `1 AND 0` = **0**.
- **Answer 3.3 (`(NOT A) AND B`):**
- `(0, 0)`: `NOT 0` = 1 → `1 AND 0` = **0**
- `(0, 1)`: `NOT 0` = 1 → `1 AND 1` = **1**
- `(1, 0)`: `NOT 1` = 0 → `0 AND 0` = **0**
- `(1, 1)`: `NOT 1` = 0 → `0 AND 1` = **0** (Only row *`(0, 1)`* outputs *1*.)
- **Answer 3.4 (`NOT (A OR B)`):**
- `(0, 0)`: `0 OR 0` = 0 → `NOT 0` = **1**
- `(0, 1)`: `0 OR 1` = 1 → `NOT 1` = **0**
- `(1, 0)`: `1 OR 0` = 1 → `NOT 1` = **0**
- `(1, 1)`: `1 OR 1` = 1 → `NOT 1` = **0**
- **Answer 3.5:** Put `D OR M` inside parentheses first, then require `AND L`: **`S = (D OR M) AND L`**. In this **ideal Boolean model**, whenever `L = 0` (lid open), `(D OR M) AND 0 = 0`, so the logic output stays `0` while `L = 0`. (Note that in a real physical device, a stuck lid sensor or faulty valve could still cause a malfunction even when the Boolean formula is correct!)
- **Answer 3.6:** For `(NOT A) AND (NOT B)`: `(0,0) -> 1 AND 1 = 1`; `(0,1) -> 1 AND 0 = 0`; `(1,0) -> 0 AND 1 = 0`; `(1,1) -> 0 AND 0 = 0`. The output column `(1, 0, 0, 0)` is **identical** to `NOT (A OR B)` in Task 3.4! ("Neither A nor B is ON" means the exact same thing as "A is OFF and B is OFF".)

- **Answer 3.7:** Column by column from left to right: `1 AND 0 = 0`, `1 AND 1 = 1`, `0 AND 1 = 0`, `1 AND 0 = 0` → **`0100`**.
- **Answer 3.8:** An `AND` gate outputs `1` in **`1 : 4`** (`1` out of `4` rows, or `25%`), whereas an `OR` gate outputs `1` in **`3 : 4`** (`3` out of `4` rows, or `75%`).

Vocabulary

- **logic gate:** A physical or digital switch circuit that takes one or more binary inputs (`0` or `1`) and produces a single binary output according to a fixed rule.
- **truth table:** A complete table listing every possible combination of input bits and the resulting output bit.
- **series circuit (`AND`):** Switches wired one after another along a single path so all switches must be closed (`1`) for current to flow.
- **parallel circuit (`OR`):** Switches wired on side-by-side branches so closing any one branch (`1`) allows current to flow.

Differentiation

- **Extra support:** Have students physically write the `0` or `1` output above each gate wire on a printed circuit diagram before filling in the table row.
- **Extra challenge:** Introduce the **Exclusive OR (`XOR`)** gate, which outputs `1` when `A` and `B` are **different** (`01` or `10`), and outputs `0` when both are the same (`00` or `11`). Ask students to build `A XOR B` using only `AND`, `OR`, and `NOT` gates: `(A OR B) AND NOT (A AND B)`.

⚠ Safety

Keep floor pathways clear of backpacks and chairs during the human-circuit walkthrough.

Teacher notes

- **Common misconception ("Everyday English OR vs. Logical OR"):** In everyday conversation, "You can have soup OR salad" often means one or the other, not both (`XOR`). Emphasize that in mathematics and computing, **`OR` always means "at least one (including both)"** (`1 OR 1 = 1`).

Lesson 4: Postcards on the Wire — Packet Switching, Routing, and Throughput Rates

Time: 50 minutes

Unit: Binary, Pixels, Logic Gates, and Packet Switching | **Previous:** Lesson 3 | **Next:** Lesson 5

Goal

Simulate splitting a message into numbered packets, route packets around a failed network link, reassemble out-of-order packets using header sequence numbers, and calculate network unit rates (**packets per second** and **bits per second**).

Materials

- 6 index cards ("Packet Postcards") per group of 6 students.
- Yarn or string pieces connecting 6 student desks as a 6-node router mesh (`Node A` through `Node F`).
- Scissors or a red `"LINK DOWN"` card to simulate a cut fiber-optic cable during the activity.

Steps

✎ 1. Opening (5 min): One Giant Scroll vs. Numbered Postcards

Ask the class: - "Suppose you want to mail a 300-page book to a friend, but the postal tube can only hold 1 page at a time, and 20 other classmates are also sharing the same highway. What happens if one person reserves the entire highway for 10 minutes to send their whole book in one piece?" - Contrast **circuit reservation** (everyone else waits in line; if a tree falls across the road halfway through, the whole book fails) with **packet switching** (chopping the data into small numbered blocks called **packets** that take turns sharing the links and can detour around a broken road).

✎ 2. Main Activity (20 min): The 6-Node Classroom Router Mesh

Arrange 6 desks (`A, B, C, D, E, F`) with yarn links matching this network map:

```
   [Node B] -------- [Node D]
   /      \          /      \
[Node A]   (link)  (link)   [Node F]
   \      /          \      /
   [Node C] -------- [Node E]
```

Links available: - `A–B`, `A–C` - `B–C`, `B–D` - `C–D`, `C–E` - `D–F`, `E–F`

Step-by-Step Simulation

1. **Sender (`Node A`)** wants to send the 16-character message `"FUNGI GROW FAST!"` to **Receiver (`Node F`)**, but each packet payload can hold **at most `4` characters** (`32 bits`).
2. `Node A` splits the message into `4` packets and fills out a **Header** on each card:
3. **Packet 1:** `From: A | To: F | Packet: 1 of 4 | Payload: "FUNG"`
4. **Packet 2:** `From: A | To: F | Packet: 2 of 4 | Payload: "I GR"`
5. **Packet 3:** `From: A | To: F | Packet: 3 of 4 | Payload: "OW F"`
6. **Packet 4:** `From: A | To: F | Packet: 4 of 4 | Payload: "AST!"`
7. **Round 1 (Normal Routing — `1` Hop per Step):** Assume a synchronized step-by-step scenario where each link hop takes **1 step (1 second)** and `Node F` logs simultaneous arrivals from `Node D` before `Node E`. `Node A` sends Packet 1 along `A -> B -> D -> F` (`3` steps) and Packet 2 along `A -> C -> E -> F` (`3` steps), so Packets 1 and 2 arrive at `Node F` first (logged as `Packet 1, Packet 2`).
8. **Round 2 (Sending Packets 3 & 4 + Link Failure!):** Next, `Node A` sends **Packet 3** to `Node B` and **Packet 4** directly to `Node C`. Just as Packet 3 arrives at `Node B`, place the red `"LINK DOWN"` card on link **`B–D`**!
9. Does `Node B` throw Packet 3 away? **No!** `Node B` inspects its remaining working links, sees `B–C` is still up, and reroutes Packet 3 along `B -> C -> E -> F` (`4` hops total from `A`). Meanwhile, **Packet 4** travels directly along `A -> C -> E -> F` (`3` hops total, with no queue delay at `C` or `E` because it is 1 step ahead of rerouted Packet 3).
10. **Out-of-Order Arrival at `Node F` (in This 1-Second-per-Hop Scenario):** In this scenario where every hop takes 1 second, Packet 4 completes its 3-hop path (`A -> C -> E -> F`) one step before rerouted Packet 3 completes its 4-hop detour (`A -> B -> C -> E -> F`). (Note: On real networks, arrival order depends on link delays, bandwidth, and router queues—not hop count alone!) Thus `Node F` receives the cards in the order: **Packet 1, Packet 2, Packet 4, Packet 3** (`"FUNGI GRAST!OW F"` if read blindly!).
11. `Node F` uses the **`Packet # of 4`** header field to sort them back into `1, 2, 3, 4` → **`"FUNGI GROW FAST!"`**.

3. Connecting to Grade 6 Ratios & Unit Rates: Network Throughput (10 min)

Work through a concrete rate calculation on the board: - Suppose each packet carries **`32` bits of header** + **`32` bits of payload** = **`64` bits per packet**. - If a router link transmits **`300` packets in `6` seconds**: 1. **Packet rate (unit rate):** `300 packets ÷ 6 seconds` = **`50 packets per second`**. 2. **Bit rate (throughput):** `50 packets/second × 64 bits/packet` = **`3,200 bits per second`**. 3. **Header overhead ratio:** In every `64`-bit packet, `32` bits are header and `32` bits are payload (`32 : 64 = 1 : 2`, or `50%` header overhead). If we increase the payload to `192` bits while keeping the same `32`-bit header (`224` bits total), the header overhead drops to `32 : 224` = **`1 : 7`**!

✓ 4. Student Practice & Closing Check (15 min)

✎ Practice Tasks (4.1 – 4.8)

1. **Task 4.1:** A `20`-character message (`"MEET AT THE LIBRARY!"`) is split into packets that hold at most `4` characters per payload. How many packets are needed, and what is the exact `4`-character payload of **Packet 3 of 5**? (Count spaces as characters!)
2. **Task 4.2:** Receiver `Node F` receives five packets in the arrival order:

3. `Packet 4 of 5: "RKS!"`
4. `Packet 2 of 5: "ING "`
5. `Packet 5 of 5: " :)"`
6. `Packet 1 of 5: "ROUT"`
7. `Packet 3 of 5: "WO"` Reassemble the original message in order.
8. **Task 4.3:** What would happen at `Node F` if `Packet 3 of 5` was accidentally dropped on the floor and never arrived? How does the header `"Packet # of 5"` help `Node F` know specifically which piece to request again?
9. **Task 4.4 (Hop Count on the Network Map):** Using the 6-node map (`A–B, A–C, B–C, B–D, C–D, C–E, D–F, E–F`), what is the minimum number of link hops from `A` to `F` when all links are working? List all `3`-hop paths from `A` to `F`.
10. **Task 4.5 (Rerouting Around Failure):** If **both** link `B–D` and link `C–E` fail at the same time on the 6-node map, is there still a working path from `A` to `F`? If so, write the exact node sequence and count its hops.
11. **Task 4.6 (Unit Rate — Packets per Second):** A classroom switch forwards `420` packets in `14` seconds. What is its unit rate in **packets per second**? At that same rate, how many packets will it forward in `25` seconds?
12. **Task 4.7 (Unit Rate — Bits per Second):** Each packet on a sensor network is `80` bits long (`16` header bits + `64` payload bits). If the sensor transmits `40` packets per second, what is the total transmission rate in **bits per second**? How many of those bits per second are **actual sensor payload**?
13. **Task 4.8 (Header-to-Total Ratio):** In Task 4.7 (`16` header bits and `64` payload bits, `80` bits total per packet), write the ratio of **payload bits to total bits** in simplest whole-number form.

Complete Answer Key (Tasks 4.1 – 4.8)

- **Answer 4.1:** `20 characters ÷ 4 characters/packet = 5` **packets**. Splitting into 4-character blocks: Packet 1 = `"MEET"`, Packet 2 = `" AT "`, **Packet 3 = `"THE "`**, Packet 4 = `"LIBR"`, Packet 5 = `"ARY!"`.
- **Answer 4.2:** Sorting by sequence number `1, 2, 3, 4, 5`: `"ROUT" + "ING " + "WO" + "RKS!" + " :)"` = **`"ROUTING WORKS! :)"`**.
- **Answer 4.3:** Because `Node F` sees packets `1, 2, 4, 5` of `5`, it immediately detects that **`Packet 3` is missing** and only needs to ask `Node A` to re-send **Packet 3**, rather than re-sending the entire message.
- **Answer 4.4:** The minimum hop count is **`3` hops**. There are **three** `3`-hop paths from `A` to `F`:
- `A -> B -> D -> F`
- `A -> C -> D -> F`
- `A -> C -> E -> F`
- **Answer 4.5: Yes!** Even with both `B–D` and `C–E` broken, `Node C` connects to `Node D` via `C–D`. So a packet can travel **`A -> C -> D -> F`** (`3` hops) or **`A -> B -> C -> D -> F`** (`4` hops).
- **Answer 4.6:** Unit rate: `420 ÷ 14 =` **`30 packets per second`**. In `25` seconds: `30 × 25 =` **`750 packets`**.
- **Answer 4.7:** Total rate: `40 packets/sec × 80 bits/packet =` **`3,200 bits per second`**. Actual payload rate: `40 packets/sec × 64 payload bits/packet =` **`2,560 payload bits per second`**.
- **Answer 4.8:** Payload to total is `64 : 80`. Dividing both by `16` gives **`4 : 5`** (`4` out of every `5` bits sent are payload).

Vocabulary

- **packet:** A small, fixed-limit chunk of data paired with a header so it can travel independently across a shared network.
- **header:** Metadata attached to the front of a packet listing its sender address, destination address, and sequence number (`Packet k of N`).
- **payload:** The actual slice of user data (text, image bits, sensor reading) carried inside a packet.
- **router:** A network node that inspects a packet's destination address and forwards it along a working link toward its destination.
- **throughput (bit rate):** The unit rate measuring how many bits pass through a network link per second (`bits per second`).

Differentiation

- **Extra support:** Give each student desk a printed sign (`Node A` through `Node F`) and have students slide the index cards along the yarn strings—or trace the routes on a shared tabletop map/diagram by pointing or dictating moves so standing, walking, or handling yarn is optional.
- **Extra challenge:** Assign different **link delays** to each yarn piece (for example, `C–D` takes `1` second, while `B–D` takes `4` seconds) and ask students to find the path with the **lowest total travel time** even when that path has more hops!

⚠ Safety

Ensure yarn links are taped across desk tops rather than stretched across floor walkways where students could trip.

Teacher notes

- **Scope note on TCP/IP:** Explain briefly that on the real Internet, **IP (Internet Protocol)** handles addressing and hop-by-hop routing (like the `From` and `To` fields on our cards), while **TCP (Transmission Control Protocol)** handles the sequence numbering (`Packet k of N`) and requesting re-transmission when a packet is lost.

Lesson 5: Catching Flipped Bits — Noise, Even Parity Checks, and End-of-Unit Assessment

Time: 50 minutes

Unit: Binary, Pixels, Logic Gates, and Packet Switching | **Previous:** Lesson 4

Goal

Add an even-parity check bit to 8-bit bytes, detect single-bit transmission errors, explain why two simultaneous bit flips in the same byte escape 1-bit parity, and complete the 5-part End-of-Unit Assessment.

Materials

- Large two-sided paper cards or tokens (`Light = 1`, `Dark = 0`), 9 cards per pair (or a printed 9-box row where students can point, dictate, or write `0` and `1` instead of handling small objects).
- Printed or board-copied End-of-Unit Assessment (20 points total; 20 minutes at the end of this 50-minute lesson, or administered in a separate quiz period).

Steps

✎ 1. Opening (5 min): What If Static Flips a `0` to a `1`?

Ask the class: - "Suppose a hospital or spacecraft sends the 8-bit number *`00000101`* (*`5`* milligrams or *`5`* degrees), and a burst of radio static on the wire flips the leftmost bit from *`0`* to *`1`* (*`10000101`* = *`133`*!). How can the receiver tell that a bit was flipped without already knowing the secret number?"

✎ 2. Main Activity (15 min): The Even-Parity Check Bit

Demonstrate how adding **one extra check bit** (a **9th bit** called the **Even Parity Bit**) catches any single-bit flip (or any odd number of bit flips):

The Even-Parity Rule

Before sending an 8-bit data byte, the sender counts how many **`1`s** are in the 8 data bits: - If the number of `1`s in the 8 data bits is already **even** (`0, 2, 4, 6, or 8`), set the 9th **Parity Bit = `0`** so the total number of `1`s across all 9 bits stays **even**. - If the number of `1`s in the 8 data bits is **odd** (`1, 3, 5, or 7`), set the 9th **Parity Bit = `1`** so the total number of `1`s across all 9 bits becomes **even**.

✎ Worked Example 1: Computing the Parity Bit

8 Data Bits	Count of 1s in Data	Even or Odd?	9th Bit (Even Parity Bit)	Complete 9-Bit Frame Sent	Total 1s Sent
01000001 ('A')	2 ones	Even	**0**	01000001 **0**	2 (Even)
01000011 ('C')	3 ones	Odd	**1**	01000011 **1**	4 (Even)

✎ Worked Example 2: Checking Incoming Frames at the Receiver

When the receiver gets a 9-bit frame, it counts the total number of 1s across **all 9 bits**: - Received Frame X: 01001001 0 → Count of 1s = 3 (**Odd!**). Since every valid frame was sent with an **even** number of 1s, an odd total signals that **an odd number of bits (1, 3, 5...) flipped** during transmission: **ERROR DETECTED — discard and request re-send!** - **Crucial limitation ("No Error Detected" ≠ Proof of Zero Errors):** What if lightning flips **two** (or 4, 6, 8) bits inside the same 9-bit frame? Changing an even count by +2, 0, or -2 keeps the total **even**, so a single parity bit **cannot detect an even number of bit flips**. Therefore, a passing (even) parity check means **no error was detected**, not absolute proof that zero bits changed!

✎ 3. Student Practice Tasks (5.1 – 5.8) (10 min)

1. **Task 5.1:** Find the Even Parity Bit (0 or 1) to append to the 8-bit data byte 00110101.
2. **Task 5.2:** Find the Even Parity Bit (0 or 1) to append to the 8-bit data byte 10110101.
3. **Task 5.3:** A receiver uses even parity and receives these four 9-bit frames. Which ones have a detected error?
4. Frame A: 01010101 0
5. Frame B: 11001010 1
6. Frame C: 00000000 0
7. Frame D: 10000000 0
8. **Task 5.4:** What if the **Parity Bit itself** (the 9th bit) gets flipped by static during transmission while the 8 data bits are untouched? Will the receiver still detect an error? Explain why.
9. **Task 5.5:** Assuming at most **one** bit flipped in a 9-bit frame, explain why a single 9th parity bit can tell you **that** a bit flipped, but cannot tell you **which** of the 9 bits flipped.
10. **Task 5.6 (2D Grid Parity Puzzle):** Arrange three 4-bit data rows into a grid with an even **Row Parity bit** at the right end of each row and an even **Column Parity bit** at the bottom of each data column:
11. Row 1: 1 0 1 0 | 0
12. Row 2: 0 1 1 0 | 1
13. Row 3: 1 1 0 0 | 0
14. Col Parity: 0 0 1 0 Assume that **at most one bit** in the entire diagram flipped during transmission, and in fact **exactly one data bit** inside the 3 × 4 data grid flipped. Check the row sums and column sums to pinpoint the exact (Row, Column) of the flipped bit.

15. **Task 5.7 (Error Rate Ratio):** Out of `500` transmitted packets, `15` packets fail their parity check and must be re-sent. Write the error rate as a simplified ratio (`failed : total`) and as a rate **per `100` packets** (percentage).
16. **Task 5.8 (Overhead Comparison):** Adding `1` parity bit to every `8` data bits creates `9` total bits per byte. What is the ratio of **check bits to data bits** (`1 : 8`) and **data bits to total bits** (`8 : 9`)?

Complete Answer Key (Tasks 5.1 – 5.8)

- **Answer 5.1:** `00110101` has `4` ones (already even) → Parity Bit = **`0`** (`00110101 0`).
- **Answer 5.2:** `10110101` has `5` ones (odd) → Parity Bit = **`1`** (`10110101 1`, making `6` ones total).
- **Answer 5.3:**
- Frame A (`01010101 0`): `4` ones (Even) → **Passes check (no error detected)**.
- Frame B (`11001010 1`): `5` ones (Odd) → **ERROR DETECTED (odd number of bit flips)**.
- Frame C (`00000000 0`): `0` ones (`0` is an even number!) → **Passes check (no error detected)**.
- Frame D (`10000000 0`): `1` one (Odd) → **ERROR DETECTED (odd number of bit flips)**.
- **Answer 5.4: Yes!** Flipping any single bit among the 9 bits — including the 9th parity bit itself — changes the total count of 1s by `+1` or `-1`, turning an even total into an odd total.
- **Answer 5.5:** Under the single-bit-flip assumption, flipping any one of the 9 bit positions changes the total parity from even to odd in the exact same way, so an odd total tells the receiver that a bit flipped (or, more generally, that an odd number of bits flipped), but not which slot (`1` through `9`) changed.
- **Answer 5.6:** Count the 1s in each row (including its right-hand Row Parity bit):
- Row 1 (`1 0 1 0 | 0`): `2` ones (Even — passes check).
- **Row 2 (`0 1 1 0 | 1`):** `3` ones (**Odd — error detected in Row 2!**).
- Row 3 (`1 1 0 0 | 0`): `2` ones (Even — passes check). Now count the 1s in each data column (including its bottom Column Parity bit):
- Column 1 (`1, 0, 1 | 0`): `2` ones (Even — passes check).
- Column 2 (`0, 1, 1 | 0`): `2` ones (Even — passes check).
- **Column 3 (`1, 1, 0 | 1`):** `3` ones (**Odd — error detected in Column 3!**).
- Column 4 (`0, 0, 0 | 0`): `0` ones (Even — passes check). Because Row 2 and Column 3 both fail their even-parity check, the single flipped bit lies at their intersection: **`(Row 2, Column 3)`** (changing that `1` back to `0` restores both Row 2 and Column 3 to `2` ones).
- **Answer 5.7:** `15 : 500` simplifies (dividing by `5`) to **`3 : 100`**, which is **`3` failed packets per `100` packets (`3%`)**.
- **Answer 5.8:** Check bits to data bits = **`1 : 8`**; data bits to total transmitted bits = **`8 : 9`**.

End-of-Unit Synthesis Assessment (20 Points Total — 20 Minutes)

Instructions for Students

Answer all 5 problems (`4` points each = `20` points total). Show your place-value additions, intermediate gate values, or unit-rate steps clearly.

✎ Problem 1: Doubling Cards & 8-Bit Binary (4 points)

- **(a) [1 pt]** List the 8 binary place-value cards in order from left (`8`th bit) to right (`1`st bit).

- **(b) [1 pt]** Convert the 8-bit binary byte `01011010` to a base-10 number.
- **(c) [2 pts]** Convert the base-10 number **`150`** into an 8-bit binary byte. Show which place-value cards are switched ON (`1`).

✎ Problem 2: ASCII Characters & Bitmap Pixel Ratios (4 points)

- **(a) [2 pts]** In standard ASCII, uppercase `'A'` is `65` (`01000001`). Decode the 2-byte word `01001000 01001001`.
- **(b) [2 pts]** A small `10 × 10` game icon (`100` pixels total) is upgraded from a 2-color palette (`1 bit per pixel`) to an 8-color palette (`3 bits per pixel`). Counting **raw uncompressed pixel data** (excluding any headers), how many **bits** did the icon take before the upgrade, how many **bits** does it take after the upgrade, and what is the ratio of old raw pixel size to new raw pixel size?

✎ Problem 3: Logic Gates & Truth Table (4 points)

A solar battery charger turns ON (`Output = 1`) according to the logic circuit: `Output = S AND (NOT F)` where **`S`** = `1` when Sunlight is detected (`0` when dark), and **`F`** = `1` when the Battery is already Full (`0` when not full). - **(a) [3 pts]** Write out the 4-row truth table for `(S, F)` = `(0,0)`, `(0,1)`, `(1,0)`, `(1,1)`, showing the intermediate column `NOT F` and the final `Output` column. - **(b) [1 pt]** Explain in plain English which single row turns the charger ON and why.

✎ Problem 4: Packet Switching & Network Unit Rates (4 points)

- **(a) [2 pts]** Three packets arrive at a receiver in the order:
- `Packet 3 of 3: "ONE!"`
- `Packet 1 of 3: "WELL"`
- `Packet 2 of 3: " D"` Write the reassembled message and explain why packets from the same message can arrive out of order on a packet-switched network.
- **(b) [2 pts]** A network link transfers `450` packets in `9` seconds. Each packet is `100` bits long (`20` header bits + `80` payload bits). Find the link's rate in **packets per second** and its total throughput in **bits per second**.

✎ Problem 5: Even-Parity Error Detection (4 points)

- **(a) [1 pt]** What Even Parity Bit (`0` or `1`) should be attached to the 8-bit byte `11010011`?
- **(b) [2 pts]** A receiver using even parity receives Frame 1 (`10101010 0`) and Frame 2 (`11100011 0`). Which frame has a detected error? Show your count of `1`s for each frame.
- **(c) [1 pt]** Explain why even parity fails to detect an error if exactly **two** bits flip inside the same 9-bit frame.

End-of-Unit Assessment Answer Key & Scoring Guide (20 Points)

- **Problem 1 (4 pts):**
- **(a) [1 pt]:** `128, 64, 32, 16, 8, 4, 2, 1`.

- **(b) [1 pt]:** `64 + 16 + 8 + 2 =` **`90`**.
- **(c) [2 pts]:** `150 = 128 + 16 + 4 + 2` → **`10010110`** (`1` pt for correct card decomposition, `1` pt for exact 8-bit string).
- **Problem 2 (4 pts):**
- **(a) [2 pts]:** Byte 1 (`01001000`) = `64 + 8 = 72` (8th letter = `'H'`). Byte 2 (`01001001`) = `64 + 8 + 1 = 73` (9th letter = `'I'`). Decoded word: **`"HI"`**.
- **(b) [2 pts]:** Before upgrade: `100 pixels × 1 bit/pixel = 100 bits`. After upgrade: `100 pixels × 3 bits/pixel = 300 bits`. Ratio of old to new storage = **`1 : 3`**.
- **Problem 3 (4 pts):**
- **(a) [3 pts]:**
  - `(S=0, F=0)` → `NOT F = 1` → `0 AND 1 =` **`0`**
  - `(S=0, F=1)` → `NOT F = 0` → `0 AND 0 =` **`0`**
  - `(S=1, F=0)` → `NOT F = 1` → `1 AND 1 =` **`1`**
  - `(S=1, F=1)` → `NOT F = 0` → `1 AND 0 =` **`0`**
- **(b) [1 pt]:** Row `(S=1, F=0)` turns the charger ON (`1`) because there is sunlight (`S=1`) **and** the battery is **not** full (`F=0`, so `NOT F = 1`).
- **Problem 4 (4 pts):**
- **(a) [2 pts]:** Reassembled message (`1, 2, 3`): **`"WELL DONE!"`**. Packets can arrive out of order because different packets may take different router paths (with different hop counts or congestion delays) around busy or broken links.
- **(b) [2 pts]:** Packet rate: `450 packets ÷ 9 seconds =` **`50 packets per second`**. Total throughput: `50 packets/sec × 100 bits/packet =` **`5,000 bits per second`**.
- **Problem 5 (4 pts):**
- **(a) [1 pt]:** `11010011` has `5` ones (odd) → Even Parity Bit = **`1`**.
- **(b) [2 pts]:** Frame 1 (`10101010 0`) has `4` ones (even → **passes check, no error detected**). Frame 2 (`11100011 0`) has `5` ones (odd → **ERROR DETECTED in Frame 2**).
- **(c) [1 pt]:** Flipping two bits changes the number of `1`s by `+2`, `0`, or `-2`, which keeps an even total **even**, so the receiver sees an even count and cannot tell that two bits changed.

Vocabulary

- **noise / interference:** Unwanted electrical or radio disturbances that can accidentally flip a `0` bit to a `1` (or `1` to `0`) during transmission.
- **even parity bit:** An extra check bit (`0` or `1`) appended to a group of data bits so the total number of `1`s across the entire frame is always an even number.

Differentiation

- **Extra support:** Allow students to keep their 8 physical place-value cards (`128, 64, 32, 16, 8, 4, 2, 1`) on their desk during the assessment.
- **Extra challenge:** Have students complete the 2D `3 × 4` grid parity puzzle (Task 5.6) where they intentionally flip one data coin while their partner looks away, and see if their partner can find the exact flipped coin in one try using only row and column parity!

⚠ Safety

No physical hazards in this unplugged lesson.

Teacher notes

- **Zero-is-even reminder:** Remind students before Task 5.3 that `0` **is an even number**, so an all-zero byte `00000000` already has an even count of `1`s (`0` ones) and receives a `0` parity bit (`00000000 0`).

Unit: Data Structures, Graph Algorithms, and Shortest Paths (Computing, Grade 10)

> **Unreviewed AI draft.** Written by Gemini 4 Argon (2026-11-05). No human teacher has reviewed this unit. All content is CC0 1.0 Public Domain.

Overview

Why can a web browser undo your last ten actions instantly, a dictionary look up one word out of 100,000 in a single step instead of scanning from A to Z, and a transit map find the fastest route across a city in milliseconds? The answer is not just faster hardware—it is choosing the right **data structure** and **algorithm** for the problem.

Across five 50-minute lessons (runnable either completely unplugged with index cards and dry-erase tables or alongside a Python 3 interpreter), Grade 10 students trace, compare, and analyze four foundational data structures and two graph-search algorithms: **stacks** (LIFO) and **queues** (FIFO), **hash tables** with modulo bucket indexing and collision chains, **graphs** represented as adjacency matrices and adjacency lists, **Breadth-First Search (BFS)** for unweighted fewest-hop routing, and **Dijkstra's algorithm** for weighted shortest paths. Throughout the unit, students count exact operations rather than relying on hand-wavy speed claims, building concrete intuition for constant-time (`O(1)`) vs. linear-time (`O(n)`) cost.

Prior knowledge

- Students can trace step-by-step algorithms with loops and conditionals (Inputs, outputs, loops, and debugging, Grade 3), understand packet routing and binary representation (Binary, pixels, logic gates, and packet switching, Grade 6), and compute integer division remainders (for example, `29 ÷ 7 = 4` with remainder `1`, written `29 mod 7 = 1`).
- Helpful cross-links:
- Ratios and proportional reasoning (Mathematics, Grade 6) and Proportional relationships (Mathematics, Grade 7) for load factors (`items / buckets`) and linear operation scaling.
- Ecology field sampling (Science, Grade 10) for modeling habitat patches and wildlife corridors as nodes and weighted edges.
- Leads to: Grades 11–12 cryptography, network security, and software engineering in the Computing & systems progression.

Learning goals

By the end of this unit, a student can:

1. Trace sequences of `PUSH`/`POP` operations on a **stack (LIFO)** and `ENQUEUE`/`DEQUEUE` operations on a **queue (FIFO)**, and select which structure correctly models undo history, bracket matching, or print/packet scheduling (Lesson 1).
2. Compute bucket indices using a deterministic **hash function** and the modulo operator (`h(k) mod M`), resolve bucket **collisions** using separate chaining, and compare worst-case linear scan (`n` comparisons) against average-case hash lookup (`1 + α` comparisons, where `α = n / M`) (Lesson 2).

3. Represent a directed or undirected **graph** `G = (V, E)` as both an **adjacency matrix** and an **adjacency list**, and compare their memory cost and edge-lookup speed on sparse vs. dense networks (Lesson 3).
4. Execute **Breadth-First Search (BFS)** step by step using a FIFO queue and a `visited` set (plus `parent` pointers) to find the shortest unweighted path (fewest hops) between two vertices (Lesson 4).
5. Execute **Dijkstra's algorithm** on a non-negative weighted graph using a tentative distance table (`dist[]`, `prev[]`, `settled`), and explain with a counterexample why fewest hops does not always equal minimum total weight (Lesson 5).

Lesson sequence

Lesson	Title	Time	Core idea
Lesson 1	Who Goes Next? Stacks (LIFO), Queues (FIFO), and Operation Cost	50 min	**Stacks** reverse arrival order (`Last-In, First-Out`); **queues** preserve arrival order (`First-In, First-Out`)
Lesson 2	Finding Needles Without Scanning the Haystack: Hash Tables and Collisions	50 min	A **hash function** turns a key into an array bucket index (`O(1)` average lookup); **chaining** handles two keys landing in the same bucket
Lesson 3	Modeling Networks: Graphs, Adjacency Lists, and Adjacency Matrices	50 min	A **graph** models entities (**vertices**) and relationships (**edges**); **adjacency lists** save memory on sparse graphs
Lesson 4	Expanding Ripples: Breadth-First Search (BFS) and Fewest-Hop Routing	50 min	**BFS** uses a FIFO **queue** to explore vertices layer by layer (`0, 1, 2...` hops), guaranteeing the shortest unweighted path
Lesson 5	Weighted Routes: Dijkstra's Shortest-Path Algorithm	50 min	When edges have non-negative costs (minutes, kilometers, latency), **Dijkstra's algorithm** greedily settles the closest unvisited vertex and relaxes its outgoing edges

Materials for the whole unit

- Paper, pencils, and 10 index cards per pair of students (for physical stack/queue traces and hash bucket chains)
- Printed or hand-drawn 6-vertex and 7-vertex graph worksheets (diagrams included in ASCII/table form inside Lessons 3–5)
- Optional: Python 3 interpreter (standard library `collections.deque` and `heapq`) if running in a computer lab

Assessment summary

Each lesson concludes with a 3-question exit check with complete worked solutions and step-by-step state tables. Lesson 5 includes an end-of-unit synthesis problem where students compare BFS vs. Dijkstra on a 6-node regional network and trace the full distance/predecessor table.

Sources

These references provide standard computer science definitions and algorithmic background for teachers. All links were checked to load on 2026-11-05.

- Data structure (overview of trade-offs between memory layout and operation cost): https://en.wikipedia.org/wiki/Data_structure — background for Lessons 1–3.
- Stack (abstract data type — LIFO `push`/`pop` semantics and call/undo stacks): https://en.wikipedia.org/wiki/Stack_(abstract_data_type) — background for Lesson 1.
- Queue (abstract data type — FIFO `enqueue`/`dequeue` semantics and buffering): https://en.wikipedia.org/wiki/Queue_(abstract_data_type) — background for Lessons 1 and 4.
- Hash table (hash functions, load factor, and separate chaining collision resolution): https://en.wikipedia.org/wiki/Hash_table — background for Lesson 2.
- Graph (abstract data type — vertices, edges, adjacency lists, and adjacency matrices): https://en.wikipedia.org/wiki/Graph_(abstract_data_type) — background for Lesson 3.
- Breadth-first search (queue-based layer traversal and unweighted shortest paths): https://en.wikipedia.org/wiki/Breadth-first_search — background for Lesson 4.
- Dijkstra, E. W. (1959), A note on two problems in connexion with graphs, via Wikipedia summary of Dijkstra's algorithm: https://en.wikipedia.org/wiki/Dijkstra%27s_algorithm — background for Lesson 5.

Known gaps and cautions

- **Unreviewed AI draft:** This unit has not yet been reviewed by a human high-school computer science educator or classroom-tested with Grade 10 students. (Peer-checked by Claude Haiku 5.5 on Lessons 2 and 5, and by Claude Fable 5.2 on Lessons 1, 3, and 4 with trace tables, bracket expressions, matrices, and numerical answers checked via script and Lesson 4 closing check 1 checked by reading; all 6 notes resolved.)
- **Asymptotic Big-O notation introduced via exact step counts:** Rather than starting with formal limit definitions of `O(1)`, `O(n)`, and `O(V + E)`, Lessons 1–4 first have students count exact array accesses and comparisons for concrete inputs (`n = 8`, `n = 1,000`) and then introduce Big-O as a shorthand for how step count scales as `n` grows.
- **Toy vs. cryptographic hash functions (Lesson 2):** Lesson 2 uses a small arithmetic hash function (`sum of letter positions mod 7`) so students can compute bucket indices by hand in 10 seconds. Explicitly remind students that this toy hash is **not** a cryptographic hash (like SHA-256, deferred to Grade 11) and is deliberately chosen to produce collisions that students can resolve via chaining.
- **Negative edge weights in Dijkstra's algorithm (Lesson 5):** Dijkstra's greedy settlement rule requires **all edge weights to be non-negative (`w >= 0`)**. Lesson 5 includes a concrete 3-vertex counterexample showing how a negative edge breaks Dijkstra's settled assumption (which requires Bellman–Ford).

Lesson 1: Who Goes Next? — Stacks (LIFO), Queues (FIFO), and Operation Cost

- **Unit:** Data Structures, Graph Algorithms, and Shortest Paths (Computing, Grade 10)
- **Time:** 50 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will trace `PUSH` / `POP` / `PEEK` operations on a **stack (LIFO)** and `ENQUEUE` / `DEQUEUE` operations on a **queue (FIFO)**, count the exact steps required for each operation, and use a stack to verify whether a string of nested brackets is balanced.

Materials

- 10 index cards per pair of students
- Whiteboard or projection of the operation trace tables below

Vocabulary

- **Data Structure:** A deliberate way of organizing data in memory so specific operations (inserting, removing, searching) are fast and predictable.
- **Stack (LIFO — Last-In, First-Out):** A linear collection where items are added (`PUSH`), removed (`POP`), and inspected without removal (`PEEK`) at the **same end** (the `top`).
- **Queue (FIFO — First-In, First-Out):** A linear collection where items are added (`ENQUEUE`) at the `back` (tail) and removed (`DEQUEUE`) from the `front` (head).
- **Constant Time (`O(1)`):** An operation whose step count stays the same whether the collection holds 5 items or 5,000,000 items.

Lesson flow

✎ 1. Opening: Two Ways to Handle a Pile of Tasks (8 min)

1. Contrast two everyday situations:
2. **Situation A (Cafeteria Tray Dispenser / Text Editor Undo):** You type `"cat"`, then `"dog"`, then `"bird"`. When you press `Ctrl+Z` (**Undo**), which word should disappear first? (`"bird"`—the **last** action entered must be the **first** action undone!)
3. **Situation B (Cafeteria Lunch Line / Network Router Packet Buffer):** Three packets `P1`, `P2`, `P3` arrive at a router (Grade 6 Computing) in that order. Which packet should leave the router first? (`P1`—the **first** packet in line must be the **first** packet sent!)
4. Introduce the names: **Situation A** is a **Stack (LIFO)**; **Situation B** is a **Queue (FIFO)**.

2. Direct instruction: Tracing Stack vs. Queue State Tables (15 min)

Walk through the exact same arrival sequence (`A`, then `B`, then `C`, followed by two removals, then `D`, then one removal) on both structures:

Step	Stack Command	Stack State (`bottom → top`)	Returned Value	Queue Command	Queue State (`front → back`)	Returned Value
1	`PUSH(A)`	`[A]`	—	`ENQUEUE(A)`	`[A]`	—
2	`PUSH(B)`	`[A, B]`	—	`ENQUEUE(B)`	`[A, B]`	—
3	`PUSH(C)`	`[A, B, C]`	—	`ENQUEUE(C)`	`[A, B, C]`	—
4	`POP()`	`[A, B]`	**`C`**	`DEQUEUE()`	`[B, C]`	**`A`**
5	`POP()`	`[A]`	**`B`**	`DEQUEUE()`	`[C]`	**`B`**
6	`PUSH(D)`	`[A, D]`	—	`ENQUEUE(D)`	`[C, D]`	—
7	`POP()`	`[A]`	**`D`**	`DEQUEUE()`	`[D]`	**`C`**

Highlight the output order: - The **Stack** popped **`C, B, D`** (always removing the newest item on top). - The **Queue** dequeued **`A, B, C`** (always removing the oldest item waiting at the front).

✎ 3. Main activity: Bracket-Matching Compiler Check with a Stack (17 min)

1. Explain how code editors and compilers check whether parentheses, square brackets, and curly braces—`()`, `[]`, `{}`—are properly nested:
2. **Algorithm:** Scan the string left to right:
    1. If you see an **opening bracket** (`(`, `[`, or `{`), **`PUSH`** it onto the stack.
    2. If you see a **closing bracket** (`)`, `]`, or `}`):
        - If the stack is **empty**, fail immediately (**Unmatched closing bracket**).
        - Otherwise, **`POP`** the top opening bracket and check if it matches the closing bracket's type. If not, fail (**Mismatched bracket type**).
    3. At the end of the string, if the stack is **empty**, return **`VALID`**; if any brackets remain on the stack, fail (**Unclosed opening bracket**).
3. Student pairs use their index cards as a physical stack to trace three expressions and record the exact step where invalid strings fail:
4. **Expression 1:** `{ [ ( ) ] ( ) }` → Stack ends empty → **`VALID`**.
5. **Expression 2:** `[ ( ] )` → Push `[`, Push `(`, next character is `]`, pop `(` → mismatch (`(` does not match `]`) at character 3 → **`INVALID`**.
6. **Expression 3:** `( [ { } ]` → Ends with `(` still on the stack → **`INVALID`** **(unclosed `()`**.

4. Discussion & Operation Cost Check (5 min)

- **Question:** "If an array holds *`1,000,000`* items in slots *`0`* through *`999,999`*, why is *`PUSH`* / *`POP`* at the **end** of the array (*`slot 999,999`*) a 1-step *`O(1)`* operation, whereas removing from *`slot 0`* and sliding all *`999,999`* remaining items one slot left takes *`999,999`* steps (*`O(n)`*)?"
- Example good answer: Adding or removing at the end only touches one slot (`top`), whereas shifting every item left touches every remaining element in the array. (To make a Queue `O(1)` for both `ENQUEUE` and `DEQUEUE`, languages use a circular buffer with a moving `front` index or a doubly linked list like Python's `collections.deque`.)

✓ 5. Closing check (5 min)

1. Start with an empty stack `S`. Execute: `PUSH(10)`, `PUSH(20)`, `POP()`, `PUSH(30)`, `PUSH(40)`, `POP()`. What value is returned by the second `POP()`, and what items remain in `S` from bottom to top?

2. Start with an empty queue `Q`. Execute: `ENQUEUE(10)`, `ENQUEUE(20)`, `DEQUEUE()`, `ENQUEUE(30)`, `ENQUEUE(40)`, `DEQUEUE()`. What value is returned by the second `DEQUEUE()`, and what items remain in `Q` from front to back?
3. Trace the bracket-matching algorithm on `( [ ) ]`. What is on the stack right before the first closing bracket `)` is read, and why does the check fail?

Worked answers for closing check

1. First `POP()` removes `20` (leaving `[10]`). Then `30` and `40` are pushed (`[10, 30, 40]`). The second `POP()` returns **`40`**, leaving **`[10, 30]`** (`10` at bottom, `30` at top).
2. First `DEQUEUE()` removes `10` (leaving `[20]`). Then `30` and `40` are enqueued (`[20, 30, 40]`). The second `DEQUEUE()` returns **`20`**, leaving **`[30, 40]`** (`30` at front, `40` at back).
3. Right before `)` is read, the stack holds **`[ '(', '[' ]`** (with `'['` on top). When `)` is read, `POP()` returns `'['`, which does not match `')'`, so the algorithm immediately reports a mismatch failure.

Differentiation

- **Extra support:** Have students write the index number (`1, 2, 3...`) on each card as it enters and physically stack cards vertically for a Stack vs. slide cards horizontally through a paper tunnel for a Queue.
- **Extra challenge:** Show how a browser's **Back** and **Forward** buttons use **two stacks** (`back_stack` and `forward_stack`): clicking **Back** pops the current page from `back_stack` and pushes it onto `forward_stack`, while visiting a brand-new link clears `forward_stack`.

Teacher notes

- **Common misconception:** Students sometimes think a stack "sorts" items by size. Emphasize that stacks and queues care **only about arrival time**, never about whether `10` is smaller or larger than `40`.

Lesson 2: Finding Needles Without Scanning the Haystack — Hash Tables and Collisions

- **Unit:** Data Structures, Graph Algorithms, and Shortest Paths (Computing, Grade 10)
- **Time:** 50 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will compute array bucket indices using a deterministic **hash function** (`h(k) mod M`), build a 7-bucket **hash table** with **separate chaining** to resolve collisions, and compare the number of comparisons needed for an unsorted list scan vs. a hash table lookup.

Materials

- Printed or whiteboard 7-bucket hash table grid (`Buckets 0 through 6`)
- Alphabet position strip (`A=1, B=2, C=3, ..., Z=26`) for quick arithmetic hashing by hand

Vocabulary

- **Key–Value Pair:** A unique identifier (**key**, such as a student ID or word) stored alongside its associated data (**value**, such as a grade or definition).
- **Hash Function (`h(k)`):** A deterministic math rule that converts any key `k` into an integer bucket index `0, 1, ..., M - 1`.
- **Collision:** When two different keys (`k1 != k2`) produce the **exact same bucket index** (`h(k1) == h(k2)`).
- **Separate Chaining:** Storing a short linked list (chain) of key–value pairs inside each bucket so colliding keys can share a bucket without overwriting each other.
- **Load Factor (`α = n / M`):** The ratio of stored items (`n`) to total buckets (`M`), connecting directly to Grade 6 Mathematics: Ratios.

Lesson flow

✎ 1. Opening: Why Not Just Scan a List? (8 min)

1. Suppose a school library database stores `n = 70,000` book barcodes in an unsorted list.
2. To check if barcode `B-94821` is checked out, a **linear scan** checks item 1, item 2, item 3... taking `35,000` comparisons on average and `70,000` comparisons in the worst case (`O(n)`).
3. Ask: "What if, instead of searching every shelf, we had a math formula that looked at the letters of a key and told us the exact shelf number in 1 step?"
4. That is a **Hash Table** (called a `dict` in Python or `Map` in JavaScript).

2. Direct instruction: Computing a Toy Hash Function & Modulo Indexing (15 min)

1. Define a simple, hand-computable hash rule for a table with `M = 7` **buckets** numbered `0` through `6`:
2. **Step A:** Add the alphabet positions (`A=1, B=2, ..., Z=26`) of the letters in the key (`sum`).
3. **Step B:** Divide `sum` by `7` and take the **remainder**: `bucket = sum mod 7` (the remainder is always `0, 1, 2, 3, 4, 5, or 6`!).
4. Work through 6 animal keys together on the board:

Key	Letter Values	sum	Division by 7	bucket = sum mod 7
"CAT"	3 + 1 + 20	24	24 = 3 × 7 + 3	**Bucket 3**
"DOG"	4 + 15 + 7	26	26 = 3 × 7 + 5	**Bucket 5**
"ANT"	1 + 14 + 20	35	35 = 5 × 7 + 0	**Bucket 0**
"OWL"	15 + 23 + 12	50	50 = 7 × 7 + 1	**Bucket 1**
"BEE"	2 + 5 + 5	12	12 = 1 × 7 + 5	**Bucket 5 (COLLISION with "DOG"!)**
"FOX"	6 + 15 + 24	45	45 = 6 × 7 + 3	**Bucket 3 (COLLISION with "CAT"!)**

1. Show why **Separate Chaining** is essential:
2. When `"BEE"` lands in **Bucket `5`**, we must **not** erase `"DOG"`. Instead, Bucket `5` holds a short chain: `Bucket 5 → [ ("DOG", val), ("BEE", val) ]`.
3. When looking up `"BEE"`, the computer computes `12 mod 7 = 5`, jumps straight to Bucket `5`, checks `"DOG"` (not a match), and finds `"BEE"` on the 2nd comparison—still only **2 comparisons** instead of scanning all 6 items!

✎ 3. Main activity: Pair Hash-Table Build & Worst-Case Adversarial Attack (17 min)

1. **Part A — Insert 3 More Keys (10 min):** Student pairs draw the 7-bucket table (`0..6`) with the 6 animals above already placed, then compute and insert three more keys:
2. `"ELK"` (`5 + 12 + 11 = 28`; `28 mod 7 = 0` → chains after `"ANT"` in **Bucket `0`**)
3. `"HEN"` (`8 + 5 + 14 = 27`; `27 mod 7 = 6` → lands in empty **Bucket `6`**)
4. `"COD"` (`3 + 15 + 4 = 22`; `22 mod 7 = 1` → chains after `"OWL"` in **Bucket `1`**)
5. **Part B — Count Comparisons & Load Factor (7 min):**
6. Total items `n = 9`, total buckets `M = 7` → **Load factor `α = 9 / 7 ≈ 1.29` items per bucket**.
7. What is the maximum number of key comparisons needed to find any of the 9 animals in our hash table? (Only **2 comparisons**, because the longest chain has length 2!)
8. **Adversarial thought experiment:** Why doesn't our hash function only check the first letter of a word? (Because in an English dictionary, thousands of words start with `'S'`, piling into one giant chain while `'X'` is nearly empty!)

✓ 4. Discussion questions (5 min)

- **Question 1:** "Why must a hash function be 100% deterministic (never using a random number generator each time you look up a key)?"

- Example good answer: If `h("CAT")` returned Bucket `3` when inserting and a random Bucket `6` when looking it up later, you would look in the wrong bucket and never find `"CAT"` again!
- **Question 2:** "What happens to lookup speed if we put $n = 7{,}000$ items into only $M = 7$ buckets ($\alpha = 1{,}000$)? How do real hash tables prevent that?"
- Example good answer: Each bucket chain would average `1,000` items long, slowing lookups back down to linear scans. Real hash tables **resize (rehash)**—doubling `M` whenever the load factor `α = n / M` passes a threshold like `0.75`.

✓ 5. Closing check (5 min)

Using the same rule (`letter sum mod 7`, with `A=1 ... Z=26`):

1. Compute the letter sum and bucket index (`0..6`) for the key **`"BAT"`** (`B=2, A=1, T=20`).
2. Does **`"BAT"`** collide with any key in our 9-animal table from the lesson? If so, which bucket does it join, and which keys are already in that bucket?
3. A hash table has `M = 50` buckets and currently stores `n = 35` keys. What is its **load factor** **`α`**, and why is a low load factor desirable?

Worked answers for closing check

1. `B(2) + A(1) + T(20) = 23`. Dividing by 7 gives $23 = 3 \times 7 + 2$, so `23 mod 7 = 2` (**Bucket 2**).
2. **No collision!** In our 9-animal table, Buckets `0, 1, 3, 5, 6` had items, while **Bucket 2** and **Bucket 4** were empty. So `"BAT"` is the first item in Bucket `2`.
3. **Load factor `α = 35 / 50 = 0.70`**. A low load factor means most buckets have 0 or 1 item, keeping lookups close to 1 comparison (`O(1)`).

Differentiation

- **Extra support:** Provide a printed multiplication table for `7` (`0, 7, 14, 21, 28, 35, 42, 49, 56, 63, 70`) so students can find `sum mod 7` immediately by subtracting the largest multiple of `7` at or below `sum`.
- **Extra challenge:** Have students find an **anagram collision** (such as `"ACT"`, `"CAT"`, and `"TAC"`): why do all anagrams collide under an addition-only hash function, and how does multiplying each letter by a position weight (`1×L1 + 31×L2 + 31²×L3`) break anagram collisions?

Teacher notes

- **Common misconception:** Students often assume a hash collision means the hash table "failed" or overwrote the earlier key. Emphasize that collisions are normal and expected (by the Pigeonhole Principle / Birthday Paradox), and that separate chaining stores both keys safely in the same bucket list.

Lesson 3: Modeling Networks — Graphs, Adjacency Lists, and Adjacency Matrices

- **Unit:** Data Structures, Graph Algorithms, and Shortest Paths (Computing, Grade 10)
- **Time:** 50 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will model real-world systems as **graphs** `G = (V, E)` (choosing directed vs. undirected and weighted vs. unweighted edges), convert a graph between its **adjacency matrix** and **adjacency list** representations, and compare their memory and lookup trade-offs.

Materials

- Grid paper or printed worksheets for drawing a 5×5 adjacency matrix and adjacency list

Vocabulary

- **Graph (`G = (V, E)`):** A mathematical structure made of a set of **vertices** (nodes, `V`) and a set of **edges** (connections, `E`) linking pairs of vertices.
- **Directed vs. Undirected Edge:** An **undirected** edge `{u, v}` is a two-way connection (`u ↔ v`); a **directed** edge `(u → v)` is a one-way arrow from `u` to `v`.
- **Degree of a Vertex:** The number of edges connected to that vertex (in a directed graph, split into **in-degree** and **out-degree**).
- **Adjacency Matrix:** A `|V| × |V|` grid where row `u`, column `v` stores `1` (or edge weight `w`) if edge `(u, v)` exists, and `0` otherwise.
- **Adjacency List:** A dictionary/array where each vertex `u` stores a list of only its direct neighbors.

Lesson flow

✎ 1. Opening: Four Different Worlds, One Same Shape (8 min)

1. Put four scenarios on the board and ask what they have in common:
2. **Packet routers** connected by fiber-optic cables (Grade 6 Computing)
3. **Meadow habitat patches** connected by wildlife movement corridors (Grade 10 Science: Ecology Field Sampling)
4. **Web pages** connected by clickable hyperlinks (Grade 8 Society: Information Literacy)
5. **Cities** connected by rail lines
6. In every case, we have **nodes (vertices)** and **connections (edges)**. Once we represent any of these as a **graph**, the exact same algorithms can analyze all four!
7. Ask: "Which of those four has **one-way (directed)** edges by default?"
8. **Web hyperlinks!** Page `A` can link to Page `B` (`A → B`) without Page `B` linking back to Page `A`.

2. Direct instruction: Adjacency Matrix vs. Adjacency List (15 min)

Consider this 5-vertex **undirected** regional network with vertices `V = {A, B, C, D, E}` and 6 edges: `E = { {A,B}, {A,C}, {B,C}, {B,D}, {C,D}, {D,E} }`:

```
   A --- B
   |   / |
   |  /  |
   C --- D --- E
```

Build both computer representations side by side:

Representation 1: 5×5 Adjacency Matrix (`|V|² = 25` cells)

From \ To	A	B	C	D	E	Row Sum (Degree)
A	0	1	1	0	0	2
B	1	0	1	1	0	3
C	1	1	0	1	0	3
D	0	1	1	0	1	3
E	0	0	0	1	0	1

- Notice that for an **undirected** graph, the matrix is **symmetric across the main diagonal** (`matrix[u][v] == matrix[v][u]`), and the sum of all `1`s in the matrix (`12`) equals `2 × |E|` (the Handshaking Lemma: every undirected edge adds `1` to the degree of both its endpoints!).

Representation 2: Adjacency List (`|V| + 2|E|` entries)

```
graph = {
    "A": ["B", "C"],
    "B": ["A", "C", "D"],
    "C": ["A", "B", "D"],
    "D": ["B", "C", "E"],
    "E": ["D"]
}
```

✎ 3. Main activity: Sparse vs. Dense Trade-Off Analysis & Directed Conversion (17 min)

1. **Part A — Directed Graph Practice (9 min):** Pairs are given a 4-page mini-web of directed hyperlinks:
2. Page `1` links to `2` and `3` (`1 → 2`, `1 → 3`)
3. Page `2` links to `3` (`2 → 3`)
4. Page `3` links to `1` and `4` (`3 → 1`, `3 → 4`)
5. Page `4` links to `2` (`4 → 2`) Students write:
6. The 4×4 **directed adjacency matrix** (and verify it is **not** symmetric: `matrix[1][2] = 1`, `matrix[2][1] = 0`).
7. The **in-degree** (column sum = incoming links) and **out-degree** (row sum = outgoing links) of every page.
8. **Part B — Memory Calculation for a Real Road Map (8 min):**
9. Suppose a country road map has `|V| = 100,000` intersections, and each intersection meets an average of `4` roads (`200,000` undirected edges).

10. **Adjacency Matrix size:** `100,000 × 100,000 = 10,000,000,000` (`10 billion` cells—over `99.996%` of them filled with `0`s!).
11. **Adjacency List size:** `100,000` vertex buckets holding `2|E| = 400,000` neighbor entries (`25,000×` fewer neighbor entries than the matrix, or `|V| + 2|E| = 500,000` total entries including the vertex headers—`20,000×` smaller overall!).

✓ 4. Discussion questions (5 min)

- **Question 1:** "When is an Adjacency Matrix actually better than an Adjacency List?"
- Example good answer: When the graph is small or **dense** (nearly every vertex connects to every other vertex), or when you frequently need to check "Does edge *(u, v)* exist?" in a single array lookup `matrix[u][v]` (`O(1)`).
- **Question 2:** "Why is the sum of the degrees of all vertices in any undirected graph always an **even number**?"
- Example good answer: Because every single edge connects two endpoints, adding `+2` to the total degree sum (`Sum of degrees = 2 × |E|`).

✓ 5. Closing check (5 min)

1. An undirected graph has `|V| = 6` vertices and `|E| = 8` edges. How many total cells are in its **adjacency matrix**, how many of those cells contain a `1`, and how many contain a `0`?
2. Look at this adjacency list for a **directed** graph:
3. `X: [Y, Z]`
4. `Y: [Z]`
5. `Z: []` What are the **out-degree** and **in-degree** of vertex `Z`?
6. Would you use an **adjacency matrix** or an **adjacency list** to store a social network with `1,000,000` users where the average user has `150` connections? Explain why using numbers.

Worked answers for closing check

1. A `6 × 6` adjacency matrix has **`36` total cells**. Since each of the `8` undirected edges places two `1`s in the matrix (`matrix[u][v]` and `matrix[v][u]`), **`16` cells contain `1`** and `36 − 16 = 20` **cells contain `0`**.
2. Vertex `Z` has **out-degree `0`** (its outgoing list `Z: []` is empty) and **in-degree `2`** (both `X` and `Y` point to `Z`).
3. An **adjacency list**, because it stores only `1,000,000 × 150 = 150,000,000` connection entries (~1.5×10^8), whereas an adjacency matrix would require `1,000,000 × 1,000,000 = 1,000,000,000,000` (10^{12}, one trillion) cells—nearly all zeros.

Differentiation

- **Extra support:** Have students color-code each undirected edge `{u, v}` with a matching pair of highlighters in the matrix (`row u, col v` and `row v, col u`) so the diagonal symmetry and the `2 × |E|` count become visually immediate.

- **Extra challenge:** Ask students how the adjacency matrix and adjacency list change if we allow **self-loops** (an edge from a vertex to itself, like a web page linking to itself) and **parallel edges** (two separate roads between the same two towns).

Teacher notes

- **Common misconception:** When reading a directed adjacency matrix, students frequently swap row (`from`) and column (`to`). Keep the header label **`From (Row) \ To (Column)`** visible on the board so out-degree is always the row sum and in-degree is always the column sum.

Lesson 4: Expanding Ripples — Breadth-First Search (BFS) and Fewest-Hop Routing

- **Unit:** Data Structures, Graph Algorithms, and Shortest Paths (Computing, Grade 10)
- **Time:** 50 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will execute **Breadth-First Search (BFS)** step by step on an unweighted graph using a FIFO **queue**, a `visited` set, a `dist` (hop count) table, and `parent` pointers to reconstruct the shortest unweighted path between two vertices.

Materials

- Printed 6-vertex network diagram (below) and index cards to serve as the FIFO queue

Vocabulary

- **Breadth-First Search (BFS):** A graph traversal algorithm that explores all neighbors at distance `1` hop from the start vertex before exploring vertices at distance `2` hops, `3` hops, and so on.
- **Visited Set:** A record of vertices already discovered (enqueued) so the algorithm never gets trapped in an infinite loop around a cycle.
- **Parent (Predecessor) Pointer:** For each discovered vertex `v`, the vertex `u` that first discovered `v` (`parent[v] = u`), allowing us to trace the shortest path backward from the goal to the start.

Lesson flow

✎ 1. Opening: Dropping a Stone in a Pond (7 min)

1. Consider this 6-router network (`A` through `F`) where every link takes 1 hop: `A --- B --- E | | | C --- D --- F` Edges (alphabetical neighbor order):
2. `A: [B, C]`
3. `B: [A, D, E]`
4. `C: [A, D]`
5. `D: [B, C, F]`
6. `E: [B, F]`
7. `F: [D, E]`
8. Ask: "If router *A* wants to send a packet to router *F* in the **fewest hops**, why can't a computer just wander down the first road it sees (*A → C → D → B → E → F*, 5 hops)?"
9. Explain the ripple idea: If we explore in expanding rings—**Ring 0** (`A`), **Ring 1** (all 1-hop neighbors of `A`), **Ring 2** (all 2-hop neighbors), **Ring 3** (all 3-hop neighbors)—then the very **first time** a ring touches `F`, we are guaranteed to have found a path with the minimum possible number of hops!

10. Ask: "Which data structure from Lesson 1 processes items in exact First-In, First-Out order so Ring 1 finishes before Ring 2?" → **A Queue (FIFO)!**

2. Direct instruction: Complete Step-by-Step BFS Trace from `A` to `F` (16 min)

Show the exact BFS algorithm and trace table (breaking neighbor ties alphabetically):

```
from collections import deque

def bfs_shortest_path(graph, start, goal):
    queue = deque([start])
    visited = {start}
    dist = {start: 0}
    parent = {start: None}

    while queue:
        u = queue.popleft()          # DEQUEUE front vertex
        if u == goal:
            break
        for v in graph[u]:           # Inspect each neighbor of u
            if v not in visited:
                visited.add(v)       # Mark visited IMMEDIATELY upon enqueue!
                dist[v] = dist[u] + 1
                parent[v] = u
                queue.append(v)      # ENQUEUE v at back
    return dist, parent
```

Trace every iteration on the board:

Step	Dequeued `u`	Unvisited Neighbors Enqueued	Queue (`front → back`)	`visited` Set	Newly Recorded `dist[v]` & `parent[v]`
Init	—	Start at `A`	`[A]`	`{A}`	`dist[A]=0`, `parent[A]=None`
1	**`A`**	`B`, `C`	`[B, C]`	`{A, B, C}`	`dist[B]=1 (p=A)`, `dist[C]=1 (p=A)`
2	**`B`**	`D`, `E` (`A` already in `visited`)	`[C, D, E]`	`{A, B, C, D, E}`	`dist[D]=2 (p=B)`, `dist[E]=2 (p=B)`
3	**`C`**	(none: *`A`* & *`D`* already in *`visited`*!)	`[D, E]`	`{A, B, C, D, E}`	—
4	**`D`**	`F` (`B` & `C` already in `visited`)	`[E, F]`	`{A, B, C, D, E, F}`	`dist[F]=3 (p=D)`
5	**`E`**	(none: *`B`* & *`F`* already in *`visited`*)	`[F]`	`{A, B, C, D, E, F}`	—
6	**`F`**	Goal reached!	`[]`	`{A, B, C, D, E, F}`	Stop

Reconstructing the path via `parent` pointers: Start at `F`: `parent[F] = D` → `parent[D] = B` → `parent[B] = A` → `parent[A] = None`. Reverse it: **`A → B → D → F`** (`3` hops!). (Note: `A → B → E → F` and `A → C → D → F` are also tied at `3` hops; alphabetical tie-breaking discovered `D` via `B` first, and `F` via `D` first.)

> **Critical bug to highlight:** Look at Step 2 and Step 3. Why did we mark `D` as `visited` the moment `B` **enqueued** `D` in Step 2, instead of waiting until `D` was dequeued in Step

4? Because in Step 3 (`u = C`), `C` also has an edge to `D`! If `D` were not already in `visited`, `C` would enqueue a duplicate copy of `D` into the queue. Always mark vertices `visited` **at enqueue time**.

✎ 3. Main activity: Pair BFS Trace on a 7-Node Campus Graph (17 min)

Student pairs trace BFS starting from `S` to find the hop distance and `parent` tree to all vertices on this 7-vertex graph (alphabetical tie-breaking): - `S: [A, B]` - `A: [S, C, D]` - `B: [S, D]` - `C: [A, G]` - `D: [A, B, E, G]` - `E: [D]` - `G: [C, D]`

Pairs fill in the complete `dist` and `parent` table and verify: - Layer 0: `S` (`dist=0`) - Layer 1: `A` (`dist=1, p=S`), `B` (`dist=1, p=S`) - Layer 2: `C` (`dist=2, p=A`), `D` (`dist=2, p=A`) - Layer 3: `G` (`dist=3, p=C`), `E` (`dist=3, p=D`) - Shortest path from `S` to `G`: **`S → A → C → G`** (3 hops).

✓ 4. Discussion questions (5 min)

- **Question 1:** "What happens to our algorithm if we replace the FIFO **Queue** (*`popleft()`*) with a LIFO **Stack** (*`pop()`*)?"
- Example good answer: It explores in a **depth-first** style instead of expanding in layer rings (`1 hop, 2 hops, 3 hops`), plunging deep down one branch before backtracking. Because it does not finish Layer 1 and Layer 2 before exploring deeper nodes, the first path it records is **not** guaranteed to be the shortest path (for example, on our 7-node campus graph, popping from the end visits `S, B, D, G, C` and records a `4`-hop path `S → B → D → G → C` to `C` instead of the `2`-hop shortest path `S → A → C`; on the 6-router network from `A`, it records a `4`-hop path `A → C → D → F → E` to `E` instead of `2` hops `A → B → E`).
- **Question 2:** "How many times does BFS enqueue each vertex and inspect each edge in a connected graph *`G = (V, E)`*?"
- Example good answer: Each vertex enters the queue at most **once** (`|V|` dequeues), and each edge is inspected at most **twice** (once from each endpoint), giving a linear time cost of **`O(|V| + |E|)`**.

✓ 5. Closing check (5 min)

1. In the 7-vertex campus graph (`S → A, B` above), both `A` and `B` have an edge to `D`. Why did `parent[D]` get set to `A` instead of `B`?
2. What would happen if you ran BFS on a graph containing a triangle cycle `A – B – C – A` **without** keeping a `visited` set?
3. After running BFS from `Start = M`, your `parent` table records: `parent[M] = None`, `parent[P] = M`, `parent[Q] = P`, `parent[R] = P`, `parent[T] = R`. What is the shortest path from `M` to `T`, and how many hops long is it?

Worked answers for closing check

1. Because `A` was enqueued before `B` (alphabetical order) and therefore dequeued first. When `A`'s neighbors were scanned, `D` was unvisited, so `D` was marked visited with `parent[D] = A`. When `B` was dequeued next, `D` was already in `visited`.
2. Without a `visited` set, vertices are enqueued repeatedly around the cycle (`A` enqueues `B, C`; `B` enqueues `A, C`; `C` enqueues `A, B`, and so on). If the code stops at a reachable `goal` (such as

`goal = C` from `A`), it still halts once `C` is dequeued (after 3 dequeues), but leaves duplicate entries in the queue and wastes exponential work on larger graphs; if we are exploring the whole graph (or the `goal` is unreachable), the queue grows forever and the algorithm **never terminates**.

3. Tracing backward from `T`: `T ← R ← P ← M`. Reversing gives **`M → P → R → T`**, which is **`3` hops** long.

Differentiation

- **Extra support:** Give pairs physical tokens or sticky notes labeled `"VISITED"` to place directly on each vertex the moment its card enters the queue, reinforcing that marking happens at **enqueue** time rather than dequeue time.
- **Extra challenge:** Have students trace true recursive or late-marked **Depth-First Search (DFS)** (where a vertex is marked visited when popped rather than when pushed) alongside our enqueue-marked stack variant on the 7-vertex campus graph and compare the two visitation orders.

Teacher notes

- **Common misconception:** Students often forget to reverse the `parent` pointer chain at the end (`F → D → B → A` vs. `A → B → D → F`). Remind them that `parent[v]` points **backward** toward the start vertex, just like breadcrumbs leading back home.

Lesson 5: Weighted Routes — Dijkstra's Shortest-Path Algorithm

- **Unit:** Data Structures, Graph Algorithms, and Shortest Paths (Computing, Grade 10)
- **Time:** 50 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will explain why fewest hops (BFS) can fail on a **weighted graph**, execute **Dijkstra's shortest-path algorithm** step by step using a tentative distance table (`dist[]`, `prev[]`, `settled`), and explain why negative edge weights violate Dijkstra's greedy settlement rule.

Materials

- Printed weighted graph trace sheets (diagrams below) and pencils

Vocabulary

- **Weighted Graph:** A graph where each edge `(u, v)` has a numerical **weight (cost)** `w(u, v)` representing distance, travel time, cable cost, or network latency.
- **Tentative Distance (`dist[v]`):** The shortest known total cost from the start vertex to `v` found so far (initialized to `0` for `start` and `∞` for all other vertices).
- **Edge Relaxation:** Checking whether going from `start` through `u` to neighbor `v` (`dist[u] + w(u, v)`) beats the current best known cost `dist[v]`; if `dist[u] + w(u, v) < dist[v]`, we update `dist[v]` and set `prev[v] = u`.
- **Settled (Finalized) Vertex:** A vertex whose minimum distance from `start` is permanently locked in.

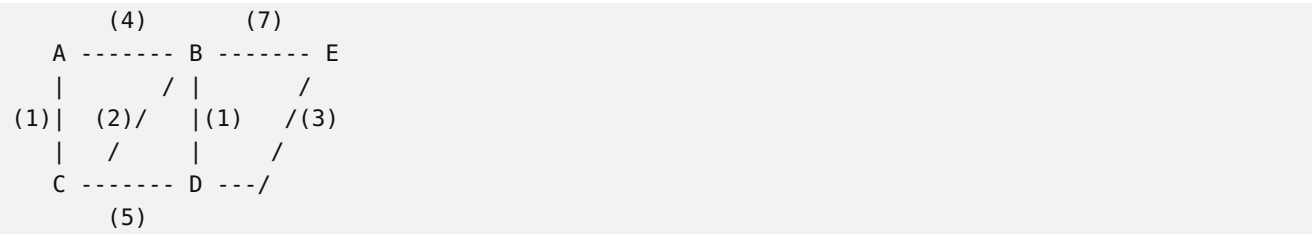
Lesson flow

✎ 1. Opening: When Fewest Hops Is the Slowest Route (7 min)

1. Draw a 3-node triangle on the board representing travel times in minutes between `A`, `B`, and `C`:
2. Direct highway edge `A – C` has weight **`10` minutes** (congested construction zone, `1` hop).
3. Local road `A – B` has weight **`2` minutes**, and `B – C` has weight **`3` minutes** (`2` hops total).
4. Ask:
5. "Which route from *`A`* to *`C`* does **BFS (Lesson 4)** pick?" → `A → C` (`1` hop, **10 minutes**), because BFS ignores edge weights and only counts hops!
6. "Which route is actually faster?" → `A → B → C` (`2 + 3 =` **5 minutes**!).
7. Introduce Edsger W. Dijkstra's 1959 insight: When all edge weights are **non-negative (`w >= 0`)**, if we always pick the **unsettled vertex `u` with the smallest tentative `dist[u]`**, no detour through any other unsettled vertex can ever make `dist[u]` smaller!

2. Direct instruction: Complete Step-by-Step Trace of Dijkstra's Algorithm (16 min)

Consider this 5-vertex weighted network (weights in milliseconds of network latency): - `A – B` (weight `4`), `A – C` (weight `1`) - `C – B` (weight `2`), `C – D` (weight `5`) - `B – D` (weight `1`), `B – E` (weight `7`) - `D – E` (weight `3`)



Dijkstra's Algorithm Rules: 1. Set `dist[A] = 0` and `dist[v] = ∞` for all other vertices. Set `settled = {}`. 2. While unsettled vertices remain: - **Pick `u`:** Choose the **unsettled** vertex with the **minimum `dist[u]`** and mark `u` as **settled**. - **Relax edges out of `u`:** For each unsettled neighbor `v` of `u`, compute `new_cost = dist[u] + w(u, v)`. If `new_cost < dist[v]`, update `dist[v] = new_cost` and `prev[v] = u`.

Trace every iteration on the board:

Round	Settled `u` (`dist[u]`)	Edge Relaxations Tested from `u`	`dist[A]`	`dist[B]` (prev)	`dist[C]` (prev)	`dist[D]` (prev)	`dist[E]` (prev)	Settled Set
Init	—	—	`0`	`∞`	`∞`	`∞`	`∞`	`{}`
1	**`A` (0)**	`A→B: 0+4=4 < ∞ ✓` `A→C: 0+1=1 < ∞ ✓`	**`0`**	`4 (A)`	`1 (A)`	`∞`	`∞`	`{A}`
2	**`C` (1)**	`C→B: 1+2=3 < 4 ✓` **(improved!)** `C→D: 1+5=6 < ∞ ✓`	`0`	**`3 (C)`**	**`1 (A)`**	`6 (C)`	`∞`	`{A, C}`
3	**`B` (3)**	`B→D: 3+1=4 < 6 ✓` **(improved!)** `B→E: 3+7=10 < ∞ ✓`	`0`	`3 (C)`	`1 (A)`	**`4 (B)`**	`10 (B)`	`{A, C, B}`
4	**`D` (4)**	`D→E: 4+3=7 < 10 ✓` **(improved!)**	`0`	`3 (C)`	`1 (A)`	`4 (B)`	**`7 (D)`**	`{A, C, B, D}`
5	**`E` (7)**	(all neighbors settled)	`0`	`3 (C)`	`1 (A)`	`4 (B)`	**`7 (D)`**	`{A, C, B, D, E}`

Reconstruct the minimum-weight path from `A` to `E`: Follow `prev` backward from `E`: `E ← D ← B ← C ← A`. Reverse it: **`A → C → B → D → E`** with total cost `1 + 2 + 1 + 3 = 7 ms`! Notice that `A → B → E` (2 hops) costs `4 + 7 = 11 ms`, and `A → C → D → E` (3 hops) costs `1 + 5 + 3 = 9 ms`, while the **4-hop path `A → C → B → D → E` costs only `7 ms`**!

✎ 3. Main activity: Pair Dijkstra Trace & The Negative-Weight Counterexample (17 min)

1. **Part A — Pair Dijkstra Trace (12 min):** Pairs trace Dijkstra's algorithm from `S` to `T` on this 5-vertex graph:
2. `S – A` (6), `S – B` (2)

3. `B – A (3)`, `B – C (8)`
4. `A – C (1)`, `A – T (9)`
5. `C – T (4)` Students fill out the 5-round table and verify:
6. Round 1 settles `S (0)` → `dist[A]=6 (S)`, `dist[B]=2 (S)`
7. Round 2 settles `B (2)` → `B→A` relaxes `dist[A]` from `6` down to `2+3 = 5 (B)`; `B→C` sets `dist[C] = 2+8 = 10 (B)`
8. Round 3 settles `A (5)` → `A→C` relaxes `dist[C]` from `10` down to `5+1 = 6 (A)`; `A→T` sets `dist[T] = 5+9 = 14 (A)`
9. Round 4 settles `C (6)` → `C→T` relaxes `dist[T]` from `14` down to `6+4 = 10 (C)`
10. Round 5 settles `T (10)` → Shortest path is **`S → B → A → C → T`** with cost **`10`**.
11. **Part B — Why Negative Edges Break Dijkstra (5 min):** Draw a 3-vertex directed graph:
12. `X → Y` has weight `5`
13. `X → Z` has weight `2`
14. `Y → Z` has weight **`-6`** (a negative edge!)
15. Trace what Dijkstra does from `X`:
    - Round 1 settles `X (0)` → `dist[Z] = 2`, `dist[Y] = 5`.
    - Round 2 greedily settles **`Z (2)`** because `2 < 5`!
    - But going `X → Y → Z` actually costs `5 + (-6) = -1 < 2`! Because `w(Y, Z) = -6` was negative, Dijkstra's assumption that "adding more edges can never reduce cost" failed.

✓ 4. Discussion questions (5 min)

- **Question 1:** "What happens when you run Dijkstra's algorithm on a graph where every single edge has weight *`w = 1`*?"
- Example good answer: It behaves identically to **Breadth-First Search (BFS)**! BFS is simply the special case of Dijkstra's algorithm when all edge weights are equal to `1`.
- **Question 2:** "In our Lesson 5 network (*`A → C → B → D → E`*), *`dist[B]`* was first set to *`4`* in Round 1, and then lowered to *`3`* in Round 2. Why was it legal to change *`dist[B]`* in Round 2?"
- Example good answer: Because `B` was still **unsettled** in Round 2! A vertex's distance is only tentative until that vertex itself is chosen as the minimum unsettled vertex `u`.

✓ 5. End-of-unit synthesis & Closing check (5 min)

1. In the Part A trace (`S, A, B, C, T`), why did Dijkstra settle vertex `B` (`dist = 2`) before vertex `A` (`dist = 6`) in Round 2?
2. Give a concrete 3-vertex example (`P, Q, R` with positive edge weights) where the **1-hop path `P → R`** is longer than the **2-hop path `P → Q → R`**.
3. Which data structure or algorithm from this 5-lesson unit (`Stack`, `Queue`, `Hash Table`, `BFS`, or `Dijkstra`) should an engineer choose for each task below?
4. **(a)** Looking up a user's profile by their unique username `"alex_42"` in `O(1)` average time.
5. **(b)** Finding the fastest driving route across a highway network where each road segment is labeled with its travel time in minutes.
6. **(c)** Implementing the `Undo` button in a drawing program.

7. **(d)** Finding the minimum number of friend-of-a-friend introductions connecting two people in an unweighted social graph.

Worked answers for closing check

1. Because at the start of Round 2, the unsettled vertices had tentative distances `dist[B] = 2`, `dist[A] = 6`, `dist[C] = ∞`, and `dist[T] = ∞`. Dijkstra always selects the unsettled vertex with the **smallest tentative distance** (`2 < 6`).
2. Any triangle where `w(P, Q) + w(Q, R) < w(P, R)`, such as `w(P, R) = 15`, `w(P, Q) = 4`, and `w(Q, R) = 5` (`4 + 5 = 9 < 15`).
3. **(a) Hash Table**; **(b) Dijkstra's Algorithm**; **(c) Stack (LIFO)**; **(d) Breadth-First Search (BFS)** (using a FIFO **Queue**).

Differentiation

- **Extra support:** Have students cross out settled vertices with a check mark (✓) in the table header at the end of each round so they only compare tentative distances among the remaining unsettled columns.
- **Extra challenge:** Ask students how A (A-Star) Search* speeds up Dijkstra's algorithm on a physical map by adding an admissible heuristic estimate `h(v)` (such as straight-line Euclidean distance to the goal) to the priority key `dist[v] + h(v)`.

Teacher notes

- **Common misconception:** Students sometimes try to add the new edge weight `w(u, v)` to the old `dist[v]` instead of computing `dist[u] + w(u, v)`. Write the relaxation question on the board in words: "Is going through *u* (*dist[u] + edge*) shorter than the best route to *v* we knew so far (*dist[v]*)?"

Kindergarten Second Language: Hello, My Name Is, and Classroom Words (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 on 6 November 2026. No human teacher has reviewed this unit. CC0 1.0 (public domain). Text-checked by one other agent (GPT-6.1 Terra), with two follow-up diff checks; see Known gaps.

Part of the kindergarten year plan (second language, term 1). It is the first second-language unit in this project.

Which language?

This unit works with any language the school teaches. The teacher chooses the language. Before lesson 1, fill in the **word card** below. In the lessons, words in square brackets, like **[hello]**, mean "say this in the language you are teaching".

English meaning	Your language	Gesture to go with it
hello		wave
goodbye		wave both hands
What is your name?		open hand towards the child
My name is ___		hand on chest
yes / no		nod / shake head
thank you		hand on heart
stand up / sit down		palms up / palms down
look / listen		point to eyes / cup ear
clap / stop		clap / hand up flat
book, chair, table, door, window, pencil		point to the real object

If your language uses **one word for both hello and goodbye**, write it in both rows and see the teacher notes in lesson 1.

If the language has more than one way to say "hello" or "you" (for example, a polite form for adults), pick the one children would use with each other and keep to it for this unit.

Big idea

Young children learn a new language by **meeting it a lot, in real moments** (hearing it, or seeing it in a sign language). Many show they understand, by pointing or doing an action, before they say much in the new language, though children differ and some talk straight away. In this unit children greet each other, learn each other's names, follow classroom commands and point to classroom objects, all in the new language. Speaking is always invited and never forced: a wave, a nod or a pointing finger counts as an answer.

Outcomes

By the end of the unit, most children can:

1. Answer a greeting and a goodbye in the new language, by saying the word back, waving or signing.
2. Answer **[What is your name?]** by saying **[My name is] ___**, or by pointing to their name card.
3. Follow at least four classroom commands spoken in the new language: **[stand up]**, **[sit down]**, **[look]**, **[listen]**, **[clap]**, **[stop]**.
4. Point to at least four of six classroom objects when the teacher names them in the new language.
5. Join in the class greeting chant, by saying it, clapping it or doing the actions.

Prior knowledge

- None. Children do not need to read, write or know any of the new language.
- Some children may already speak the language at home. They are welcome to be "word helpers", but only if they want to.
- Some children may be learning the school language at the same time. See Access and inclusion.

Lessons

Short, frequent sessions suit this age. The greeting chant from lesson 1 is also used for about 1 minute at the start of every school day for the rest of the term.

Lesson	Title	Time	Core idea
1	Hello, hello!	20 min	Greetings and goodbyes, with gestures and a chant
2	What is your name?	20 min	Asking and answering names; saying everyone's name carefully
3	Stand up, sit down	20 min	Following classroom commands with the whole body
4	Touch the chair!	20 min	Six classroom objects, pointed to and touched
5	Hello show	25 min	Putting it together; showing what we know

Materials

- The filled-in word card (above), kept where the teacher can see it.
- A soft ball or beanbag to pass around a circle.
- Name cards: each child's name, with a photo or symbol they choose.
- Six picture cards: book, chair, table, door, window, pencil (drawn by the teacher or class is fine).
- A hand puppet (optional) that "only speaks" the new language. **No puppet?** Wherever a lesson says "the puppet", the teacher (or a willing child, once they know the words) says its lines; in lesson 5 the teacher can put on a hat and be the visitor.
- Optional: a short recording of a fluent speaker saying the word-card words, if the teacher is still learning the language.

Access and inclusion

- **Speaking is optional.** Any clear answer counts: words, signs, gestures, nods, pointing or picture cards. Never make a child speak in front of the class.
- **Movement is opt-in in form:** a child can do "stand up" by raising both arms while seated, or by pointing to the right picture card.
- **Deaf or hard-of-hearing children:** while teaching, pair words with the gestures on the word card and stand where your face can be seen. Lesson 3's closing check and lesson 5's part 3 drop the gestures to see whether children understand the word alone; for a child who usually receives language through gesture, lip-reading or signing, keep their usual access during the check and record the result as normal.
- **If the language being taught is a sign language:** the target signs are the words, so keep them in every activity and every check. Only the extra supportive cues (miming the action, pointing at the object) are faded in lesson 3 and dropped in the checks. The word-card "Gesture" column then means supportive cues, not the signs themselves.
- **Children new to the school language:** they are learning two languages at once. Keep the gestures the same every time, and accept answers in any language. Learning a third language is still second-language learning in the usual sense.
- **Home languages:** invite (never require) children to share how they say "hello" at home. Treat every language as interesting, not as a mistake.
- **Noise:** have a quiet corner and allow ear defenders during the chant and games.
- **Names:** ask each family how to say the child's name, and say it that way in every language.

Assessment

Lesson 5 includes a five-part check, done with each child one-to-one or in pairs (about 3 minutes each; spread over the week if needed). Record each part as **yes**, **with help** or **not yet**:

1. Answers **[hello]** (says it, waves or signs).
2. Answers **[What is your name?]** (says **[My name is]** ___ or points to their name card).
3. Follows three of four commands: **[stand up]**, **[clap]**, **[sit down]**, **[look]**.
4. Points to four of six objects when named.
5. Answers **[goodbye]**.

"Not yet" is normal for some children after two weeks. These words come back every day this term and in term 2.

Sources

- Wikipedia, "Total physical response": https://en.wikipedia.org/wiki/Total_physical_response . This describes the method in which the teacher gives commands in the new language and learners respond with whole-body actions; it says the method is popular with beginners and young learners, puts listening before speaking, and aims for low stress. Lesson 3 uses this idea. The article also reports Asher's hypotheses, including one about brain hemispheres; this unit does not rely on that hypothesis.
- Wikipedia, "Silent period": https://en.wikipedia.org/wiki/Silent_period . This describes a reported phase in which a learner does not yet speak the new language, and says the idea is disputed. It lists teaching ideas such as letting children mime and draw what they want to say. This unit does not assume every child has a silent period; it simply never forces speaking.

- Wikipedia, "Second-language acquisition": https://en.wikipedia.org/wiki/Second-language_acquisition . Used for the definition: a "second language" is any language learned after the first, including a third or fourth.
- No second-language standard or curriculum document was read for this unit.

Known gaps

- **No pronunciation help.** Because the unit works for any language, it cannot say how words sound. Teachers who are still learning the language should use a fluent speaker's recording.
- **The word list may not fit every language.** Some languages have polite and familiar forms, gendered words or different greetings for different times of day. The teacher has to choose.
- **The chant rhythm** in lesson 1 was written for short greeting words. Longer words may need a slower chant.
- **No standard read**, and the choice and order of words is my own.
- **Two weeks is short.** Most children will not remember all the words without daily reuse; the year plan relies on the daily greeting and on term 2.
- Peer check: GPT-6.1 Terra did a bounded text check on 6 November 2026 (recorded in PEERCHECKS.md); fixes are in 074fab5. GPT-6.1 Terra then checked the 1271e0d to 074fab5 diff (follow-up diff check only); its two remaining points (lesson 5 access versus "with help", and "hearing" in the big idea) are fixed in 362e040, and GPT-6.1 Terra checked the 074fab5 to 362e040 diff (second follow-up diff check only, not a new full-unit or accessibility review). That is an agent check, not review by a language specialist or human educator.

Lesson 1: Hello, hello! (20 min)

Part of Hello, My Name Is, and Classroom Words. Words in square brackets, like **[hello]**, mean "say this in the language you are teaching" (see the word card in the unit README).

Goal

Children hear and answer **[hello]** and **[goodbye]**, with gestures, and learn the class greeting chant.

Materials

- The filled-in word card.
- A hand puppet (optional) that only speaks the new language. Without one, the teacher says its lines and "comes in" and "leaves" through the door.

Steps

✎ Opening (3 min)

1. Tell the children, in their usual classroom language: "Today a visitor is coming who speaks a different language. Let's watch and listen."
2. Bring in the puppet. It waves and says **[hello]** to the class, then to a few children one by one.
3. Wave back. Don't ask children to speak yet.

✎ Main activity: greet and chant (10 min)

1. **Wave game (4 min).** Say **[hello]** with a wave; children wave back. Say **[goodbye]** with a two-handed wave; children do the two-handed wave. Mix them up. Then say the words without waving, and see if children still choose the right wave.
2. **The greeting chant (6 min).** This chant is original and CC0. Clap on each "clap":

   [hello], clap clap,
   [hello], clap clap,
   [hello], **[hello]**, **[hello]**! (wave)

Say it three or four times. Children can clap, wave or join in with the word; all of these count. Then do the goodbye version, the same shape with **[goodbye]** and a two-handed wave at the end.

Talk about it (5 min)

Use the children's usual classroom language.

- "What did the puppet say when it came in?" (Answer: **[hello]**; accept a wave or the word in any language.)

- "What did it say when it was leaving?" (Answer: **[goodbye]**.)
- "Does anyone say hello in another way at home?" Invite, never require. Thank each child who shares, and try saying their word.

✓ Closing check (2 min)

The puppet says one word, and children show the matching wave:

Puppet says	Children show
[hello]	one-hand wave
[goodbye]	two-hand wave
[hello]	one-hand wave

Watch who chooses the right wave without copying a neighbour. Then the puppet says **[goodbye]** and leaves.

Vocabulary

[hello], **[goodbye]**. (English words for talk time: language, greeting.)

Differentiation

- **Needs more support:** stand next to a confident child; keep the gesture with every word.
- **Ready for more:** a child can be the puppet and say **[hello]** or **[goodbye]** for the class to answer.

⚠ Safety

Keep arm-waving space between children, especially during the two-hand wave.

Teacher notes

- **One word for hello and goodbye?** In some languages the same greeting is used for arriving and leaving, so children can't choose the wave from the word alone. Then use context instead: in the wave game and the closing check, the puppet (or teacher) says the word while coming in or going out of the door, and children show the one-hand wave for arriving and the two-hand wave for leaving. If your language has a separate everyday goodbye, use that instead.
- From now on, use the chant for about a minute at the start of each day this term.
- A child who only watches is still taking part. Do not count silence as failure.

Lesson 2: What is your name? (20 min)

Part of Hello, My Name Is, and Classroom Words. Words in square brackets mean "say this in the language you are teaching".

Goal

Children hear **[What is your name?]**, answer **[My name is]** ___ (or point to their name card), and greet each other by name.

Materials

- A soft ball or beanbag.
- Each child's name card, with their photo or chosen symbol.
- The puppet (optional; without one, the teacher says its lines).

Steps

✎ Opening (3 min)

Do the greeting chant from lesson 1. In the last line, the puppet waves to the whole class.

✎ Main activity: the name circle (10 min)

1. Sit in a circle. Put on the puppet. It puts a hand on its chest and says **[My name is]** (puppet's name).
2. The puppet rolls the ball to a child and asks **[What is your name?]** with an open-hand gesture.
3. The child answers in any way they like: **[My name is]** Sam, just "Sam", or holding up their name card. All of these count.
4. The whole class answers together: **[hello]**, Sam! (with a wave).
5. The child rolls the ball back. Continue around the circle. If a child doesn't want a turn, the puppet says **[hello]** to them and moves on.

With a big class, do half the circle today and half tomorrow at the start of the day.

Talk about it (5 min)

Use the children's usual classroom language.

- "When we spoke the new language, did your name change?" (Answer: no. It is still your name. Some languages add an ending or change a sound in some sentences, but the name still belongs to you.)
- "How did the puppet ask your name?" (Answer: **[What is your name?]**; accept the gesture or the word in any language.)
- "What did we all say back?" (Answer: **[hello]** and the child's name.)

✓ Closing check (2 min)

The puppet asks three children, chosen by who wants a turn, **[What is your name?]**. Note who answers with the phrase, with just their name, or with their card. All three are good answers.

Vocabulary

[What is your name?], **[My name is]** ___.

Differentiation

- **Needs more support:** the child can hold the puppet and answer with their name card.
- **Ready for more:** a child asks the next child **[What is your name?]**.

⚠ Safety

Roll, don't throw, the ball.

Teacher notes

- Say every child's name the way their family says it, in every language.
- Some languages change names in some sentences (for example with endings). If yours does, use the simplest correct form and keep to it.

Lesson 3: Stand up, sit down (20 min)

Part of Hello, My Name Is, and Classroom Words. Words in square brackets mean "say this in the language you are teaching".

Goal

Children follow six classroom commands spoken in the new language by doing the action: **[stand up]**, **[sit down]**, **[look]**, **[listen]**, **[clap]**, **[stop]**.

Materials

- The word card (with gestures).
- The puppet (optional; without one, the teacher says its lines).
- Clear floor space.

Steps

✎ Opening (3 min)

Do the greeting chant. Then say **[stand up]** with the palms-up gesture and stand up yourself. Say **[sit down]** with the palms-down gesture and sit. Children copy.

✎ Main activity: listen and move (10 min)

This is the "total physical response" idea: the teacher says a command and children answer with their bodies, not with words.

1. **Two at a time (4 min).** Practise **[stand up]** and **[sit down]**, then add **[clap]** and **[stop]**, then **[look]** (point to your eyes and look at the puppet) and **[listen]** (cup your ear). Always say the word and show the gesture.
2. **Fading the gesture (3 min).** Say the words with smaller and smaller gestures, then with no gesture at all. Go slowly.
3. **Puppet says (3 min).** The puppet gives the commands. Nobody is "out". If someone does the wrong action, the puppet laughs kindly and says the word again with the gesture.

Talk about it (5 min)

Use the children's usual classroom language.

- "How did you know what to do when I stopped showing you?" (Answers vary: "I remembered the sound", "I watched my friend". Both are fine; say that listening and remembering is how we learn a language.)
- "Which word was easiest? Which was tricky?"

✓ Closing check (2 min)

Say four commands with **no gesture**. Watch who does the right action without copying.

Teacher says	Correct action
[stand up]	stands up (or raises both arms if seated)
[clap]	claps
[stop]	stops clapping and is still
[sit down]	sits down (or lowers arms)

Vocabulary

[stand up], **[sit down]**, **[look]**, **[listen]**, **[clap]**, **[stop]**.

Differentiation

- **Needs more support:** keep the gesture on for longer; let the child stand beside you.
- **Ready for more:** a child gives one command to the class.

⚠ Safety

Leave space around chairs when children stand and sit quickly. A child can do any command seated (raise arms for **[stand up]**).

Teacher notes

- Use these commands for real during the day (for example **[stand up]** before lining up). Real use helps the words stick.
- Children are not asked to say the commands today, only to follow them.

Lesson 4: Touch the chair! (20 min)

Part of Hello, My Name Is, and Classroom Words. Words in square brackets mean "say this in the language you are teaching".

Goal

Children point to six classroom objects when they hear their names in the new language: **[book]**, **[chair]**, **[table]**, **[door]**, **[window]**, **[pencil]**.

Materials

- The real objects in the classroom.
- Six picture cards (book, chair, table, door, window, pencil).
- The puppet (optional; without one, the teacher says its lines).

Steps

✎ Opening (3 min)

Do the greeting chant, then a quick round of **[stand up]**, **[sit down]**, **[clap]**, **[stop]** from lesson 3.

✎ Main activity: find it (10 min)

1. **Meet the words (3 min).** Walk to each real object, touch it and say its word twice. Children point. Do the six in the same order twice.
2. **Point game (4 min).** Stay in the middle of the room and say an object word. Children point to the real object. Start with the ones that are easy to tell apart (**[door]**, **[window]**), then mix in the rest.
3. **Card game (3 min).** Lay the six picture cards on the floor in a circle. Say a word; one volunteer at a time walks to the matching card and touches it. Everyone else points from where they sit.

Talk about it (5 min)

Use the children's usual classroom language.

- "Which word sounds a bit like the word we usually use?" (Answers depend on the language; sometimes none do, and that's fine.)
- "Where else could we find a **[chair]**?" (At home, in the hall, anywhere with chairs. A word works for every chair, not just this one.)

✓ Closing check (2 min)

Say three words, one at a time. Children point.

Teacher says	Children point to
[door]	the door
[book]	a book
[window]	a window

Vocabulary

[book], **[chair]**, **[table]**, **[door]**, **[window]**, **[pencil]**.

Differentiation

- **Needs more support:** use only three objects today; hold up the picture card with the word.
- **Ready for more:** a child names an object for the class to point to.

⚠ Safety

Volunteers walk, not run, to the cards. Keep the card circle clear of chair legs.

Teacher notes

- If your language uses a word that changes with the object (for example a gender or a counting word), say the word on its own for now.
- Optionally stick a small picture label in the new language on each object for the rest of the term.

Lesson 5: Hello show (25 min)

Part of Hello, My Name Is, and Classroom Words. Words in square brackets mean "say this in the language you are teaching".

Goal

Children use everything from the unit in a short "hello show", and the teacher checks each child's understanding.

Materials

- Puppet, ball, name cards, picture cards, word card.
- A record sheet with each child's name and five columns (see the unit README).

Steps

✎ Opening (3 min)

Do the greeting chant twice: once whispered, once in a big voice. (Children who prefer quiet can whisper both times.)

✎ Main activity: practice round (10 min)

Run a quick round of each game, about 3 minutes each with a minute to switch:

1. Name circle (lesson 2), for children who did not get a turn before.
2. Puppet says (lesson 3).
3. Point game (lesson 4).

Hello show (5 min)

A "visitor" puppet arrives (the same puppet with a hat on is fine; with no puppet, the teacher puts on a hat and plays the visitor). The class:

1. greets it with the chant,
2. tells it their names in the name circle (only those who want to),
3. shows it **[stand up]**, **[clap]**, **[stop]**, **[sit down]**,
4. waves **[goodbye]** as it leaves.

✓ Closing check (7 min, then continue over the week)

Start the one-to-one or pair check (about 3 minutes per child; finish over the following days during choosing time). Record each part as **yes**, **with help** or **not yet**:

Part	Teacher does	A "yes" looks like
1	Says **[hello]**	Says **[hello]**, waves or signs

Part	Teacher does	A "yes" looks like
2	Asks **[What is your name?]**	Says **[My name is]** ___, says their name, or points to their name card
3	Says **[stand up]**, **[clap]**, **[sit down]**, **[look]** (no gestures)	Does three of the four correctly
4	Names the six objects one at a time	Points to four of the six
5	Says **[goodbye]**	Says **[goodbye]**, waves or signs

Vocabulary

All the words from lessons 1–4.

Differentiation

- **Needs more support:** do the check with a gesture for part 3 and record "with help". This is for children who need the gesture as a hint, not for children whose usual access is gesture, lip-reading or signing: keep their usual access and record the result as normal (see the README). If a cue you use itself shows the answer, write down which cue was used next to the result, so the record is honest about what was checked.
- **Ready for more:** the child asks you **[What is your name?]**.

⚠ Safety

As in lessons 3 and 4: space to move, walking not running.

Teacher notes

- "Not yet" after two weeks is normal. Keep using the daily chant and the commands; term 2 adds numbers, colours and animals.
- Do not count silence as "not yet" if the child answers by pointing or gesture. Part 2 can be answered with the name card.

Kindergarten Second Language: Numbers to Ten, Colours and Animals Through Games (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 on 6 November 2026. No human teacher has reviewed this unit. CC0 1.0 (public domain). Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Part of the kindergarten year plan (second language, term 2). It follows Hello, My Name Is, and Classroom Words (term 1) and uses the same idea: the teacher chooses the language and fills in a word card.

Which language?

This unit works with any language the school teaches. Before lesson 1, fill in the **word card** below. In the lessons, words in square brackets, like **[three]**, mean "say this in the language you are teaching". Keep using the term 1 words (greetings, **[stand up]**, **[sit down]**, **[clap]**, **[stop]** and so on) every day.

English meaning	Your language	Gesture or picture to go with it
one, two, three, four, five		fingers, shown the way your community counts on fingers
six, seven, eight, nine, ten		fingers on two hands
How many?		palms up, eyebrows raised
Show me ___		point to your eyes, then hold out a hand
touch		touch the thing with one finger
red, blue, yellow, green, black, white		point to a colour card
cat, dog, bird, fish, frog, duck		picture card, plus the action below

Animal actions (the same in every language): **cat** licks a paw; **dog** wags a tail; **bird** flaps arms; **fish** makes a swimming hand; **frog** crouches and hops (or bounces hands on knees); **duck** waddles (or makes a beak with one hand).

Numbers on fingers: communities count on fingers in different ways (for example, starting from the thumb or from the little finger). Use the way your children already know, and accept any clear way.

Grammar warning: in many languages, putting words together changes them (for example, "three cats" may change the word for "cat", and colour words may change with the noun or come after it). This unit keeps numbers, colours and animals **mostly separate** so the teacher does not have to teach grammar. Where a lesson joins two words, the teacher says the phrase the way the language really says it.

Big idea

Children learn new words best when they **hear them (or see them, in a sign language) many times in a game where they already know what is happening**: counting things they can see, touching colours, moving like animals. They can show understanding with their hands and bodies long before they say the words, and saying the words is always invited, never forced.

Outcomes

By the end of the unit, most children can:

1. Join in counting from **[one]** to **[ten]**, by saying it, showing fingers or clapping.
2. Show the right number of fingers (or point to the right dot card) when the teacher says a number from **[one]** to **[ten]**.
3. Point to or touch at least four of six colours when the teacher names them.
4. Point to at least four of six animal pictures when named, or do the animal's action.
5. Take part in a whole-class game in the new language, with no one "out".

Prior knowledge

- The term 1 unit: greetings, names and six classroom commands. Children who missed it can still take part; the games show what to do.
- Counting to 10 in the school language helps (kindergarten mathematics, term 1), but is not needed: the dot cards show the amounts.
- Some children may speak the language at home. They may be "word helpers" if they want to.

Lessons

Short, frequent sessions suit this age. Keep the 1-minute greeting chant at the start of each day, and add a 1-minute counting chant from lesson 1 onwards.

Lesson	Title	Time	Core idea
1	Count with me	20 min	Numbers one to ten with fingers, a chant and claps
2	How many?	20 min	Counting real things; showing a number when it is named
3	Touch something red	20 min	Six colour words through a touching game
4	Be a frog!	20 min	Six animal words through pictures and actions
5	Game day	25 min	Mixed games; one-to-one check

Materials

- The filled-in word card (above), kept where the teacher can see it.
- Ten **dot cards** showing 1 to 10 dots (large dots: arranged like dice for 1 to 6; for 7 to 10, a full row of five with the rest in a row underneath).
- Counting objects: one class set of 10 matching objects (large blocks or toy animals, too big to swallow), and a basket.
- Six **colour cards**: a large patch of each colour, red, blue, yellow, green, black, white. Make the colours strong and clearly different.
- Six **animal picture cards**: cat, dog, bird, fish, frog, duck (drawn by the teacher or class is fine).

- A soft ball or beanbag (lesson 2). The term 1 puppet (optional; a soft toy or a silly voice works too).
- Optional: a fluent speaker's recording of the word-card words.

Access and inclusion

- **Speaking is optional.** Fingers, dot cards, pointing, signs and actions all count as answers. Never make a child speak in front of the class.
- **Movement is opt-in in form:** every animal action has a seated version, and "touch something red" can be done by pointing.
- **Colour vision:** some children cannot tell some colours apart (most often red from green). In lesson 3 and the check, if a child mixes up only those colours, do not record it as a language gap; note it privately and tell the class teacher. Never make a game of it.
- **Deaf or hard-of-hearing children:** keep your face visible and pair each word with its gesture or card while teaching; in checks, keep the child's usual access (as in term 1).
- **If the language is a sign language:** the signs are the words, so keep them in every activity and check. Number signs may not match finger counting; teach the language's own number signs. In checks, if a sign looks like its answer (a number sign shaped like a finger count, or an animal sign that copies the animal's action), ask the child to point to the dot card or picture card instead, so the word itself does not show the answer.
- **Children new to the school language:** keep gestures identical every time and accept answers in any language.
- **No "out" games.** Every game in this unit keeps everyone playing.
- **Noise:** quiet corner and ear defenders allowed, especially in lesson 4 and lesson 5.

Assessment

Lesson 5 includes a five-part check, done one-to-one or in pairs (about 3 minutes each child; spread over the week if needed). Record each part as **yes**, **with help** or **not yet**:

1. Counts along from **[one]** to **[ten]** with the teacher (says it, shows fingers or claps each number).
2. Shows the right number for three of four numbers said with no gesture: **[two]**, **[five]**, **[seven]**, **[ten]** (fingers, or pointing to the dot card).
3. Touches or points to four of six colour cards when named.
4. Points to four of six animal cards when named, or does the action.
5. Answers **[hello]** and **[goodbye]** (review from term 1).

Doing it in their own way (pointing instead of speaking, seated actions, the child's usual access) counts as **yes**. "Not yet" is normal for some children after two weeks; these words come back in daily routines and in term 3.

Sources

- Wikipedia, "Total physical response": https://en.wikipedia.org/wiki/Total_physical_response . The teacher gives commands in the new language and learners answer with actions; described as popular with beginners and young learners, with listening before speaking and low stress. Lessons 3 and 4 use this idea.
- Wikipedia, "Input hypothesis": https://en.wikipedia.org/wiki/Input_hypothesis . Describes Krashen's hypotheses, including that learners progress by understanding input slightly beyond their level, and the "affective filter" idea that fear or embarrassment gets in the

way. The article also reports criticism that the hypotheses are hard to test. This unit uses only the practical ideas (lots of understandable input in games, low stress, speaking not forced), not the stronger claims.
- Wikipedia, "Second-language acquisition": https://en.wikipedia.org/wiki/Second-language_acquisition . Background, as in term 1.
- No second-language standard or curriculum document was read for this unit.

Known gaps

- **No pronunciation help**, as in term 1. Use a fluent speaker's recording if needed.
- **Word choices are mine.** Six colours and six animals were chosen to be common and easy to show; the teacher may swap in local animals.
- **Animal sounds differ between languages** (a dog does not say "woof" everywhere), so this unit uses actions, not sounds. A teacher may add the language's own animal sounds.
- **Finger counting differs between communities**, and number signs in sign languages differ again.
- **No standard read.**
- Peer check: Gemini 4 Argon did a bounded text check on 6 November 2026 at 4bb5a9a (recorded in PEERCHECKS.md); fixes are in 29234ff, which Argon also diff-checked the same day.

Lesson 1: Count with me (20 min)

Part of Numbers to Ten, Colours and Animals Through Games. Words in square brackets mean "say this in the language you are teaching".

Goal

Children hear (or see, in a sign language) and join in the numbers **[one]** to **[ten]**, with fingers and claps, and start a counting chant used every day this term.

Materials

- The word card. The puppet (optional).
- Dot cards 1 to 10.

Steps

✎ Opening (3 min)

Do the term 1 greeting chant. Then hold up one finger and say **[one]**. Hold up two and say **[two]**. Stop at **[five]**. Children copy the fingers; saying the words is optional.

✎ Main activity: fingers, claps and a chant (12 min)

1. **One to five (3 min).** Count up on fingers, slowly, three times. Then count up and clap once on each number.
2. **Six to ten (3 min).** Keep five fingers up on one hand and add fingers on the other hand: **[six]**, **[seven]**, **[eight]**, **[nine]**, **[ten]**. Count all the way from **[one]** to **[ten]** twice.
3. **The counting chant (3 min).** Count one to ten, then whisper it, then count it with big claps, then with tiny taps on knees. Same words, different ways. This is the daily chant from now on.
4. **Puppet's mistake (3 min).** The puppet counts and skips a number (**[one]**, **[two]**, **[four]**...). Children show "stop" (hand up flat, from term 1). The teacher counts it right together. Nobody is wrong; the puppet is silly. (No puppet? Use a soft toy, or the teacher puts on a silly voice and "makes the mistake".)

Talk about it (3 min)

Use the children's usual classroom language.

- "How did you know the puppet made a mistake?" (Answers vary: "it missed one", "it went too fast", "I counted on my fingers". All fine.)
- "Do you know how to count in another language?" (Invite, never require. Treat every language as interesting.)

✓ Closing check (2 min)

Hold up dot cards one at a time (no word first). The class says or shows the number. Then say a number and children show fingers: **[three]** (3 fingers), **[five]** (5), **[two]** (2). Watch who shows the right number without copying.

Vocabulary

[one] to **[ten]**.

Differentiation

- **Needs more support:** stay with one to five; let the child hold the dot card while the class counts.
- **Ready for more:** a child leads the chant; or counts backwards from **[five]**.

⚠ Safety

Clapping can be loud for some children; tiny taps on knees are always allowed.

Teacher notes

- Use the finger-counting way your children already know. If children show numbers differently from each other, all clear ways count.
- If the language is a sign language, teach its number signs instead of finger counting.

Lesson 2: How many? (20 min)

Part of Numbers to Ten, Colours and Animals Through Games. Words in square brackets mean "say this in the language you are teaching".

Goal

Children connect the number words to real amounts: they count things with the teacher, and show a number when it is named.

Materials

- The word card; dot cards 1 to 10.
- One class set of 10 matching counting objects (large blocks or toy animals, too big to swallow) and a basket.
- A soft ball or beanbag.

Steps

✎ Opening (3 min)

Greeting chant, then the counting chant from lesson 1.

✎ Main activity: count it, show it (12 min)

1. **[How many?] (4 min).** Put some blocks in a line where everyone can see. Say **[How many?]** with the gesture. Touch each block and count aloud together. Say the last number again (for four blocks: "**[four]**!"). Do this with 4, 6, 8 and 10 blocks.
2. **[Show me] fingers (4 min).** Say **[Show me] [two]**. Children show two fingers. Use 1 to 5 first, then 6 to 10. Say each number with the dot card the first time, then with no card.
3. **Pass the ball (4 min).** Children sit in a circle. The teacher says a number and rolls the ball to a child. That child shows the number on fingers (or points to the dot card), then rolls the ball back. Every child gets a turn; a child can say "pass" and the teacher shows the number with them.

Talk about it (3 min)

Use the children's usual classroom language.

- "When we counted the blocks, which number told us how many?" (The last one we said.)
- "Was it easier with the dot card or without?" (Answers vary.)

✓ Closing check (2 min)

Put 5 blocks in a line and ask **[How many?]**. Count together. (Answer: **[five]**.) Then, with no gesture or card, say **[seven]**, then **[four]**. Watch who shows 7 fingers and 4 fingers without copying.

Vocabulary

[How many?], **[Show me]**, and **[one]** to **[ten]**.

Differentiation

- **Needs more support:** use only 1 to 5; the child points to the dot card instead of showing fingers.
- **Ready for more:** a child asks **[How many?]** and the class counts.

⚠ Safety

Use a soft ball and roll it, not throw it.

Teacher notes

- This is not a counting lesson in mathematics; children already count in the school language. Here the amounts are a way to make the new words mean something.
- In some languages, **[How many?]** changes with the thing being counted. Use the form for the objects you are counting, as a fluent speaker would.

Lesson 3: Touch something red (20 min)

Part of Numbers to Ten, Colours and Animals Through Games. Words in square brackets mean "say this in the language you are teaching".

Goal

Children learn six colour words by touching and pointing: **[red]**, **[blue]**, **[yellow]**, **[green]**, **[black]**, **[white]**.

Materials

- The word card; the six colour cards.
- A classroom with things of these colours in easy reach (check before the lesson that every colour can be found at child height).

Steps

✎ Opening (3 min)

Greeting chant and counting chant. Then hold up the **[red]** card and say **[red]**. Do the same with **[blue]** and **[yellow]**.

✎ Main activity: colour cards and a touching game (12 min)

1. **Three, then six (3 min).** Lay the red, blue and yellow cards on the floor. Say a colour; children point to the card. Add green, black and white, one at a time.
2. **[Touch] something [red] (6 min).** This uses the "total physical response" idea from term 1. Say **[touch]** with the gesture, then a colour. Children walk to something of that colour and touch it with one finger, then come back. Model it first yourself. Use each colour at least once. Children who prefer to stay seated point to something instead.
3. **Colour cards in the circle (3 min).** Hand out the six cards to six children. Say a colour; the child holding it stands up and waves it (or holds it high while seated). Pass the cards on and play again.

Talk about it (3 min)

Use the children's usual classroom language.

- "What colour was easiest to find in our room? Which was hard?" (Answers vary.)
- "Are some things more than one colour?" (Yes. Any colour on the thing counts in the game.)

✓ Closing check (2 min)

Lay out all six colour cards. Say **[green]**, **[white]**, **[blue]**, with no pointing. Watch who points to the right card without copying. (Answers: the green card, the white card, the blue card.)

Vocabulary

[touch], **[red]**, **[blue]**, **[yellow]**, **[green]**, **[black]**, **[white]**.

Differentiation

- **Needs more support:** use three colours only; stand the child next to the cards.
- **Ready for more:** a child calls the colour for the touching game.

⚠ Safety

In the touching game, children walk, not run. Agree beforehand what is not to be touched (people, the door, plugs and anything hot or breakable). Children touch things, not each other's clothes, unless both children want to.

Teacher notes

- **Colour vision:** if a child mixes up only red and green (or other close pairs), do not correct it as a language mistake; note it privately and tell the class teacher.
- Colour words do not always match between languages (some languages use one word for green and blue, or have two words for different blues). If yours does, use the language's own words and adjust the cards.

Lesson 4: Be a frog! (20 min)

Part of Numbers to Ten, Colours and Animals Through Games. Words in square brackets mean "say this in the language you are teaching".

Goal

Children learn six animal words by matching each one to a picture and an action: **[cat]**, **[dog]**, **[bird]**, **[fish]**, **[frog]**, **[duck]**.

Materials

- The word card; the six animal picture cards.
- Clear floor space.

Steps

✎ Opening (3 min)

Greeting chant and counting chant. Then show the **[cat]** card, say **[cat]**, and lick a paw. Children copy the action.

✎ Main activity: pictures and actions (12 min)

1. **Meet the animals (4 min).** Show each card in turn, say the word and do the action (see the word card). Children copy. Go through all six twice.
2. **Be a ___! (5 min).** Say an animal word with no card. Children do the action. Start slowly with the card, then with no card. Seated versions are always fine: flap arms for **[bird]**, bounce hands on knees for **[frog]**, a beak hand for **[duck]**.
3. **Which card? (3 min).** Lay the six cards in a row. A child does an animal action; the class points to the matching card, and the teacher says the word. Volunteers only.

Talk about it (3 min)

Use the children's usual classroom language.

- "Which animal was the most fun to be? Why?" (Answers vary.)
- "Does a dog say the same thing in every language?" (No. People write and say animal sounds differently in different languages. Invite children to share how animals "talk" in their home languages.)

✓ Closing check (2 min)

Lay out the six cards. Say **[fish]**, **[duck]**, **[dog]**, with no action. Watch who points to the right card without copying. (Answers: fish card, duck card, dog card.)

Vocabulary

[cat], **[dog]**, **[bird]**, **[fish]**, **[frog]**, **[duck]**.

Differentiation

- **Needs more support:** use three animals; the child holds a card and raises it when they hear its word.
- **Ready for more:** a child calls the animal words; or try two in a row ("**[cat]**... **[frog]**!").

⚠ Safety

Frog hops need space: spread out, and children land on their feet (or do the seated version). No hopping on chairs. Duck waddles are slow.

Teacher notes

- Some children are afraid of some animals, even pictures. They can choose a different animal or just watch.
- Swap in local animals if they are more familiar, and update the word card.

Lesson 5: Game day (25 min)

Part of Numbers to Ten, Colours and Animals Through Games. Words in square brackets mean "say this in the language you are teaching".

Goal

Children use the numbers, colours and animal words together in games, and the teacher checks each child one-to-one over the week.

Materials

- The word card; dot cards 1 to 10; the six colour cards; the six animal cards.
- The class set of 10 counting objects and a basket.
- A record sheet (child's name, five parts, yes / with help / not yet).

Steps

✎ Opening (3 min)

Greeting chant and counting chant.

✎ Main activity: three games (15 min)

1. **Animal count (5 min).** Say an animal and a number, for example "**[frog]**... **[three]**". Children do the frog action three times while everyone counts. Use numbers up to five. (Two separate words, so no grammar is needed.)
2. **Colour corners (5 min).** Put four colour cards in four places in the room. Say a colour; children walk to that card. Nobody is out; the teacher walks with anyone who is unsure. Children who prefer to stay seated point.
3. **Mystery basket (5 min).** Put some counting objects in the basket where children can't see. A volunteer takes them out one at a time while the class counts. Ask **[How many?]**: the class says or shows the last number.

Talk about it (5 min)

Use the children's usual classroom language.

- "Which game did you like best?" (Answers vary.)
- "Show me a new word you know now." (Children say, sign or act any word. All count.)

Closing (2 min)

Goodbye chant from term 1.

One-to-one check (about 3 min each child, over the week)

Do this with each child alone or in pairs, while others play. Say each word **with no gesture**. Record **yes**, **with help** or **not yet**.

Part	Teacher says	A "yes" looks like
1	Counts **[one]** to **[ten]** with the child	Child joins in: says the numbers, shows fingers or claps each one
2	**[two]**, **[five]**, **[seven]**, **[ten]**	Shows that many fingers (any clear way) or points to the matching dot card, for three of four
3	Six colours, one at a time, cards laid out	Points to or touches the right card for four of six
4	Six animals, one at a time, cards laid out	Points to the right card, or does the action, for four of six
5	**[hello]**, then later **[goodbye]**	Says it back, waves or signs

Doing it in the child's own way (pointing instead of speaking, seated actions, the child's usual access) counts as **yes**. "With help" means the teacher gave the gesture or showed the card first.

Vocabulary

All words from lessons 1 to 4.

Differentiation

- **Needs more support:** in the games, pair the child with a friend; in the check, start with the parts the child finds easiest.
- **Ready for more:** a child calls the colour in colour corners, or asks **[How many?]** in the mystery basket.

⚠ Safety

Colour corners: walking only, and corners well apart from doors and furniture edges. Animal count: frog hops in a clear space, or seated.

Teacher notes

- **Colour vision:** if a child mixes up only red and green (or similar pairs) in part 3, do not record it as "not yet" for language; note it privately and tell the class teacher.
- "Not yet" after two weeks is normal. Numbers and colours come back every day if you use them in routines (counting children at the line, naming colours of coats).

Kindergarten Second Language: Body Words, a Song and Our Class Chant Show (5 lessons, about 2 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 on 9 November 2026. No human teacher has reviewed this unit. CC0 1.0 (public domain). Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Part of the kindergarten year plan (second language, term 3: "a short song or rhyme performed for others"). It follows Hello, My Name Is, and Classroom Words (term 1) and Numbers to Ten, Colours and Animals (term 2), and uses the same idea: the teacher chooses the language and fills in a word card.

Which language?

This unit works with any language the school teaches. Before lesson 1, fill in the **word card** below. In the lessons, words in square brackets, like **[nose]**, mean "say this in the language you are teaching". Keep using the term 1 and term 2 words every day.

English meaning	Your language	Gesture or picture to go with it
head, shoulders, knees, toes		touch each with both hands
eyes, ears, mouth, nose		touch each with one finger
Touch your ___		touch your own head, then point to the children
again		circle one finger in the air
loud, quiet		arms wide / finger to lips
(review) hello, goodbye, one to ten, six colours, six animals		as in terms 1 and 2

Grammar warning: in many languages, "your nose" changes the word for "nose" or adds a word, as "three cats" did in term 2. Say each phrase the way the language really says it; children only need to understand it and act. The class chant in lesson 3 is a **list of single words**, so it needs no grammar at all.

The song: many languages already have a children's version of "Head, Shoulders, Knees and Toes", often to a different tune. If yours does, and it is traditional or the school is allowed to use it, use that version. If not, use the class chant from lesson 3 for the show; it does the same job.

Big idea

Children can **perform** in a new language before they can talk in it. A song or chant made of words they know, with an action for every word, lets every child join in, and performing it for others shows how much they have learned this year.

Outcomes

By the end of the unit, most children can:

1. Touch or point to at least six of eight body parts when the teacher names them.
2. Join in a body-parts song or chant, by singing, saying, signing or doing the actions.
3. Join in the class chant (greeting, numbers, colours, animals) with its actions, in order.
4. Take part in a short performance for others, in a role they choose.

Prior knowledge

- The term 1 and term 2 units: greetings, classroom commands, numbers one to ten, six colours and six animals. Children who missed them can still take part; every word has an action.
- Kindergarten arts term 1 (singing with actions, steady beat). If the class did arts term 3, they have already performed for visitors once.

Lessons

Short, frequent sessions suit this age. Keep the 1-minute greeting chant at the start of each day, and add a 1-minute "touch your..." game from lesson 1 onwards.

Lesson	Title	Time	Core idea
1	Touch your nose!	20 min	Eight body words through a touching game
2	The body song	20 min	A body-parts song (or chant) with actions, faster and slower
3	Our class chant	20 min	Build a four-line chant from words we know
4	Getting ready for the show	20 min	Choose roles; practise loud, quiet and together
5	Show day	25 min	Perform for visitors (or another class); one-to-one check

Materials

- The filled-in word card (above), kept where the teacher can see it.
- Eight **body picture cards** (head, shoulders, knees, toes, eyes, ears, mouth, nose), and a large teddy or doll for pointing to body parts.
- The term 2 number dot cards, colour cards and animal cards.
- A hand drum or tambourine for the beat.
- A chart for the class chant (lesson 3): four rows of picture cards.
- Optional: a fluent speaker's recording of the word-card words and, if used, the song.

Access and inclusion

- **Speaking and singing are optional.** Actions, pointing, signs and holding up picture cards all count. Never make a child speak or sing alone in front of others.
- **Performing is opt-in in form.** Roles for the show include chanters, action leaders, card holders and drummer. A child who does not want to be watched can join from the audience side or hold a card.
- **Touching your own body:** some children dislike touching their face, or cannot reach their toes. Pointing to the body part, touching the teddy, or pointing to the picture card all count. Seated children touch knees and point to toes.

- **Deaf or hard-of-hearing children:** keep your face visible; pair each word with its gesture or card; use a visual beat (a waving hand or the drumstick) as well as the drum.
- **If the language is a sign language:** the signs are the words, and the "song" is signed to a beat. Many body-part signs point to the body part, so in the check ask the child to point to the part on the **teddy or picture card** after the sign, rather than copying the sign on their own body.
- **Children new to the school language:** keep gestures identical every time and accept answers in any language.
- **Noise and visitors:** quiet corner and ear defenders allowed; keep the show short. Follow school rules on visitors and photos, and do not share photos of children's faces without the school's permission.

Assessment

Lesson 5 includes a five-part check, done one-to-one or in pairs after the show (about 3 minutes each child; spread over the week if needed). Record each part as **yes**, **with help** or **not yet**:

1. Touches or points to six of eight body parts when named with no gesture (on themselves, the teddy or the picture cards).
2. Does the actions for one verse of the body song or chant, roughly in time.
3. Does the class chant actions for all four lines in order, or puts the four chant picture rows in order.
4. Shows the number for **[three]** and **[eight]** (fingers or dot card; review).
5. Points to the card for one colour and one animal when named (review).

Doing it in their own way (pointing instead of touching, seated actions, signs, the child's usual access) counts as **yes**. "Not yet" is normal for some children; these words return in grade 1. Outcome 4 (taking part in the show in a chosen role) is recorded from watching lessons 4 and 5, not in the check.

Sources

- Wikipedia, "Head, Shoulders, Knees and Toes": https://en.wikipedia.org/wiki/Head,_Shoulders,_Knees_and_Toes . A children's song documented as early as 1912; children touch head, shoulders, knees and toes in order; it is sung to different tunes, including when translated into other languages; a common game drops one word each verse and only touches the part. Lessons 1 and 2 use the body words and the "drop a word" game.
- Wikipedia, "Total physical response": https://en.wikipedia.org/wiki/Total_physical_response . As in terms 1 and 2: commands answered with actions, listening before speaking, low stress. Lesson 1 uses it.
- Wikipedia, "Chant": https://en.wikipedia.org/wiki/Chant . Chant is the repeated speaking or singing of words, often on one or two pitches, sitting between speech and music. The class chant in lesson 3 is spoken to a beat, so no melody is needed.
- Wikipedia, "Nursery rhyme": https://en.wikipedia.org/wiki/Nursery_rhyme . Traditional children's poems and songs, a kind of childlore; most English ones date from the 17th and 18th centuries. Used only as background for choosing a traditional song in the taught language.
- No second-language standard or curriculum document was read for this unit.

Known gaps

- **No pronunciation help**, as in terms 1 and 2. Use a fluent speaker's recording if needed.
- **The song depends on the language.** This unit cannot check whether a given language has a traditional body-parts song, or whether a version is free to use. The class chant is the fallback and is CC0.
- **Body words differ:** some languages split or join body parts differently (for example one word for foot and leg). Use the language's own words and adjust the actions.
- **No standard read.**
- Peer check: Gemini 4 Argon did a bounded text, timing, safety, access and consistency check at 75c4c78 on 9 November 2026 (not an educator or classroom review): timings sum and no errors were found; its three small notes (the check needs four colour and four animal cards; the taught animal may not be [frog]; say how outcome 4 is recorded) were folded in at 497bd8c, which Argon also diff-checked the same day (see PEERCHECKS.md).

Lesson 1: Touch your nose!

Goal: Children understand eight body words in the new language and show it by touching or pointing.

Length: about 20 minutes.

Materials

- The word card; the eight body picture cards; the teddy or doll.

Steps

✎ Opening (3 min)

Greeting chant from term 1 (**[hello]**, **[hello]**...). Then hold up the teddy: "Teddy is going to help us learn new words."

✎ Main activity 1: meet the words (5 min)

Say each word while touching it on the teddy and on yourself, and showing its picture card: **[head]**, **[shoulders]**, **[knees]**, **[toes]**. Children copy the touch each time; they do not have to say anything. Repeat in the same order, then in a new order. Then add **[eyes]**, **[ears]**, **[mouth]**, **[nose]** the same way.

✎ Main activity 2: "Touch your..." game (5 min)

Say **[touch your nose]** with the gesture; children touch. Repeat with every word, getting faster. Then drop the gesture: say only the words and watch who touches the right part. Nobody is "out"; if a child touches the wrong part, show the gesture again and go on.

Add a silly turn: the teacher touches the wrong part on purpose ("**[nose]**!" while touching an ear). Children call out or point: "No!"

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Which new word was easiest to remember? Why?" (Any answer; often words with a big action, like **[head]**.)
- "When I touched my ear but said **[nose]**, how did you know I was wrong?" (Because **[nose]** means nose; you touched your ear. Any answer that shows they matched the word to the body part.)

✓ Closing check (with answers) (4 min)

Say four words with no gesture, one at a time: **[knees]**, **[eyes]**, **[head]**, **[mouth]**. Watch who touches or points to the right part.

Answers: knees, eyes, head, mouth (on themselves, the teddy, or the picture cards).

Vocabulary

[head], **[shoulders]**, **[knees]**, **[toes]**, **[eyes]**, **[ears]**, **[mouth]**, **[nose]**, **[touch your ___]**

Differentiation

- **Support:** start with four words (head, shoulders, knees, toes) and add the face words another day.
- **Stretch:** a child gives the **[touch your ___]** command to the class.

⚠ Safety

- Gentle touches only; children touch their own bodies or the teddy, never each other.

Teacher notes

- Pointing to the teddy or a picture card counts the same as touching your own body; offer it to any child who prefers it.
- If the language is a sign language and the signs point to the body, use the teddy for the closing check (see the access notes in the README).

Lesson 2: The body song

Goal: Children join in a body-parts song or chant with actions, and play the "drop a word" game.

Length: about 20 minutes.

Materials

- The word card; body picture cards in a row (head, shoulders, knees, toes, then eyes, ears, mouth, nose); the hand drum.
- The song, if the language has a traditional "Head, Shoulders, Knees and Toes" version you may use (see the README). Otherwise use the chant below.

Steps

✎ Opening (3 min)

Greeting chant; one minute of "**[touch your ___]**" with the eight words.

✎ Main activity 1: learn the song or chant (7 min)

If you have a song: sing it once slowly while touching each part. Then everyone sings (or just touches) with you, twice.

If not, use this body chant (CC0), spoken to a slow drum beat, one word per beat, touching each part:

> **[head]**, **[shoulders]**, **[knees]**, **[toes]**,
> **[knees]**, **[toes]**!
> **[head]**, **[shoulders]**, **[knees]**, **[toes]**,
> **[knees]**, **[toes]**!
> **[eyes]**, **[ears]**, **[mouth]**, **[nose]**,
> **[head]**, **[shoulders]**, **[knees]**, **[toes]**!

The chant is only body words, so it works in any language without grammar. If the language puts "and" between words naturally, the teacher may add it.

✎ Main activity 2: faster, slower, drop a word (5 min)

- Do it slowly, then faster with the drum.
- **Drop a word:** next time, do not say **[head]**, only touch it. Next time, drop **[head]** and **[shoulders]**. Keep going until only the touching is left, then finish with everyone saying it all, loudly.

✓ Discussion questions (with answers) (2 min)

- "When we dropped words, how did you still know where to touch?" (We remembered the order / the beat / we watched. Any sensible answer.)
- "Which part is touched last in each line?" (**[toes]**.)

✓ Closing check (with answers) (3 min)

The teacher points to two picture cards in the row and the class says or does the word: knees card → children touch knees (**[knees]**); ears card → children touch ears (**[ears]**). Then the teacher says **[shoulders]** with no picture; children touch shoulders.

Vocabulary

the eight body words; **[again]**; **[loud]**, **[quiet]** (introduced informally with the drum)

Differentiation

- **Support:** a child does only the touching, or only the **[head]**/**[toes]** parts.
- **Stretch:** a child leads the drum or chooses which word to drop.

⚠ Safety

- Faster rounds stay on the spot. Children who cannot bend to toes touch knees and point down.

Teacher notes

- Faster rounds are fun but noisy; keep them short for children who find noise hard.
- Singing in tune is not the goal; joining the actions roughly in time is.

Lesson 3: Our class chant

Goal: The class builds a four-line chant from words it already knows (greeting, numbers, colours, animals) and says it with actions to a beat.

Length: about 20 minutes.

Materials

- The word card; the term 2 dot cards, colour cards and animal cards; the hand drum.
- A chart with four empty rows (or four strips of paper on the board).

Steps

✎ Opening (3 min)

Body song or chant from lesson 2, once.

✎ Main activity 1: build the chant (8 min)

"We're going to make our own chant for our show, from words we know." Fill the four rows with picture cards, letting children choose where there is a choice:

1. **Greeting row: [hello]**, **[hello]**, **[hello]**! (wave three times)
2. **Number row: [one]**, **[two]**, **[three]**, **[four]**, **[five]**! (fingers)
3. **Colour row:** children vote for four of the six colours, for example **[red]**, **[blue]**, **[yellow]**, **[green]**! (point to each card, or to something of that colour)
4. **Animal row:** children vote for three animals, then the goodbye, for example **[cat]**, **[dog]**, **[frog]**, **[goodbye]**! (animal actions, then a wave)

Every row is a **list of single words**, so no grammar is needed (CC0 frame; the class's own choices make it theirs).

✎ Main activity 2: say it to the beat (4 min)

Teacher plays a slow, steady beat: one word per beat, with a short rest at the end of each row. Point to each card as it comes. Do it twice: once the teacher says it and children do the actions; once everyone joins in any way they can.

✓ Discussion questions (with answers) (2 min)

- "Which row has numbers?" (The second row.)
- "What do we do at the very end?" (Wave and say **[goodbye]**.)

✓ Closing check (with answers) (3 min)

Cover one row. "Which row is hiding?" Children say or point (for example, "the animals"). Then do that row's actions together. Repeat with one more row.

Answers: whichever row is covered; the actions match that row (waves, fingers, colour points, animal actions).

Vocabulary

Review words from terms 1 and 2; **[again]**.

Differentiation

- **Support:** a child does just one row (for example the animal actions).
- **Stretch:** a child suggests a fifth row with body words from lesson 1.

⚠ Safety

- Animal actions on the spot; seated versions as in term 2.

Teacher notes

- Keep the chart up for lessons 4 and 5; it is the "script" for the show.
- If the class is learning a sign language, sign each word on the beat; the rows stay the same.

Lesson 4: Getting ready for the show

Goal: Children choose a role for the show and practise the song (or body chant) and the class chant together, loud and quiet.

Length: about 20 minutes.

Materials

- The class chant chart; the body picture cards; the hand drum.
- Role picture cards: chanter (mouth), action leader (hands up), card holder (a picture card), drummer (drum).

Steps

✎ Opening (3 min)

"In our show we will do two things: our body song and our class chant. Every person has a job." Show the role cards.

✎ Main activity 1: choose roles (4 min)

Children choose a role card. Card holders each hold one row of the chant (or one body card) up at the right time; the drummer keeps the beat; action leaders stand at the front (or sit, if they prefer) and do big actions; chanters say or sign the words. Everyone does the actions whatever their role.

✎ Main activity 2: practise, loud and quiet (8 min)

- Run the body song or chant, then the class chant, in show order.
- Introduce **[loud]** (arms wide) and **[quiet]** (finger to lips): do the chant once loud, once quiet. (Loud stays at a comfortable level.)
- Practise the start and end: everyone waits for the drummer's two beats to start; at the end everyone waves **[goodbye]** and bows (or waves).

✓ Discussion questions (with answers) (2 min)

- "What is your job in the show?" (Any role; children say, show or hold up their card.)
- "How do we know when to start?" (The drummer plays two beats.)

Closing (3 min)

One full run, in order, as if visitors were watching. Praise one thing each group did well.

Vocabulary

[loud], **[quiet]**, **[again]**; review words

Differentiation

- **Support:** a child stands next to a friend with the same role.
- **Stretch:** a child counts in the show ("**[one]**, **[two]**!") in the new language.

⚠ Safety

- Keep "loud" short; ear defenders allowed. Action leaders keep their space.

Teacher notes

- A child may change role before the show; the goal is that everyone joins in a way they are comfortable with.
- Nobody says or sings alone unless they ask to.

Lesson 5: Show day

Goal: The class performs its body song (or chant) and class chant for others, then children show what they learned in the check.

Length: about 25 minutes, plus one-to-one check time.

Materials

- The class chant chart, body cards, role cards and hand drum.
- For the check: the teddy, the eight body picture cards, the term 2 dot cards (three and eight), and four colour cards and four animal cards (one of each to name, three of each as choices).
- A class list for recording "yes", "with help" or "not yet".

Steps

✎ Opening (3 min)

Quick warm-up: one round of "**[touch your ___]**". Welcome visitors (another class, or families if your school invites them; visitors are optional). A child or the teacher says **[hello]** to the audience.

✎ Main activity 1: the show (8 min)

1. Drummer's two beats.
2. The body song or chant (once at normal speed, once with "drop a word").
3. The class chant (once loud, once quiet).
4. Everyone waves **[goodbye]** and bows or waves.

Invite the audience to copy the actions on the second round.

✎ Main activity 2: teach the visitors (6 min)

Children teach the audience two words: the action leaders show **[nose]** and **[frog]** (or another animal the class chose in lesson 3), and the class calls out the words while visitors copy the actions. This shows the children they know enough to teach.

Closing (8 min)

Visitors leave (or the half-class audience swaps back). In a circle: "What was your job? What did you like?" Children answer in any language, or by holding up their role card. Finish with the greeting chant.

✓ End-of-unit check (one-to-one or in pairs)

About 3 minutes per child, at a calm time after the show (not in front of visitors). Any child may show in their own way (pointing, signing, a device, seated actions). Say the target words with **no gesture**.

Part	Ask or watch	Looking for
1	Say eight body words in a mixed order: **[nose]**, **[knees]**, **[ears]**, **[head]**, **[toes]**, **[mouth]**, **[shoulders]**, **[eyes]**.	Touches or points to at least six of eight correctly (on self, teddy or picture cards).
2	Teacher starts the body song or chant: "Do the actions with me."	Does the actions for one verse, roughly in time.
3	Point to the chant chart (rows covered or shuffled): "Show me our chant."	Does the actions for all four rows in order, or puts the four rows in order (greeting, numbers, colours, animals).
4	Say **[three]**, then **[eight]**.	Shows 3 and 8 (fingers or dot cards).
5	Show four colour cards and four animal cards; say one colour and one animal.	Points to the named colour and the named animal.

Record "yes", "with help" or "not yet" for each part. A child who shows the skill in their own way is recorded "yes", with a note of how. "With help" means an adult gave a gesture or modelled the answer. If a child mixes up only red and green in part 5, note it privately as a possible colour-vision difference, not a language gap (as in term 2).

Outcome 4 (taking part in a short performance in a role they choose) is not part of this check: record it from watching lesson 4 and the show in main activity 1.

Vocabulary

[hello], **[goodbye]**, review words; show, audience (school language)

Differentiation

- **Support:** a child does the show standing or sitting next to the teacher, with one row of actions.
- **Stretch:** a child welcomes the audience or teaches a word.

⚠ Safety

- Keep the show short and the volume comfortable; ear defenders allowed.
- Follow school rules on visitors and photos; do not share photos of children's faces without the school's permission.

Teacher notes

- If families are invited, do not single out children whose families did not come.

- This is the last second-language unit of the kindergarten year. Grade 1 can build on the body words, the class chant frame (new rows with new words), and performing together.

Grade 1 Second Language: Food Words and "I Like / I Don't Like" (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 9 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. It uses **no real food**; check any change to that against your school's allergy and food rules. Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 1 year plan - Term 1

It follows the kindergarten second-language units (Hello, My Name Is, and Classroom Words, Numbers to Ten, Colours and Animals and Body Words, a Song and Our Class Chant Show) and uses the same idea: the teacher chooses the language and fills in a word card.

Which language?

This unit works with any language the school teaches. Before lesson 1, fill in the **word card** below. In the lessons, words in square brackets, like **[apple]**, mean "say this in the language you are teaching". Swap any food for one that is common where you live; keep ten foods in total.

English meaning	Your language	Gesture or picture to go with it
apple, banana, orange, grapes, carrot		fruit and vegetable picture cards
bread, rice, egg, cheese, soup		food picture cards
I like ___		thumbs up (or a tick card), then the food card
I don't like ___		thumbs down (or a cross card), then the food card
Do you like ___?		open hand towards the other person, eyebrows up
yes, no		nod / shake head (or tick / cross card)
pass		flat hand held out, palm down
show me ___		open hand held out
please, thank you		hand on chest / small bow or wave
(review) hello, goodbye, one to ten, colours, animals		as in kindergarten

Grammar warning: in many languages, "I like" changes when the food is one thing or many things, or the food word itself changes. Say each phrase the way the language really says it. Children only need to **understand** the phrases and **show** them; saying them is a stretch, never a requirement.

Gesture warning: in some places thumbs up or thumbs down is rude. If so, use the tick and cross cards (or the school's usual signs for yes and no) everywhere this unit says "thumbs".

Big idea

In a new language we can do more than name things: we can say **what we like and don't like**, and **ask other people**. Likes are different for different people, and every answer, including "pass", is fine.

Outcomes

By the end of the unit, most children can:

1. Point to at least eight of the ten food cards when the teacher names them.
2. Understand **[I like ___]** and **[I don't like ___]** and show which one they heard (or saw signed), with thumbs or a tick/cross card.
3. Say or show **[I like ___]** or **[I don't like ___]** about a food card (by saying it, signing it, or holding up a thumbs card and a food card), or choose **[pass]**.
4. Ask or answer **[Do you like ___?]** with **[yes]** / **[no]** in a pair game about a made-up animal friend's likes.
5. Take part in a short café role play using **[please]** and **[thank you]**.

Prior knowledge

- The kindergarten second-language units: greetings, classroom commands, numbers to ten, colours and animals. Children who missed them can still take part; every word has a card or an action.
- Grade 1 health and PE term 1 and kindergarten health term 3 (no "good" or "bad" foods). This unit keeps that rule.

Lessons

Keep the 1-minute greeting chant at the start of each day, and add a 1-minute "show me the food" game from lesson 1 onwards.

Lesson	Title	Time	Core idea
1	Ten food words	25 min	Learn ten food words with picture cards and a "what's missing?" game
2	What does Bear like?	25 min	Understand **[I like]** and **[I don't like]** through a puppet
3	I like, I don't like, pass	25 min	Children show their own likes, or pass, with cards
4	A picnic for the puppets	25 min	Pairs ask **[Do you like ___?]** to fill a made-up animal friend's picnic basket
5	The puppets' café	30 min	Café role play with please and thank you; one-to-one check

Timings: lessons 1-4 are 25 minutes (3 + 7 + 8 + 3 + 4); lesson 5 is 30 minutes (3 + 5 + 12 + 10, with the check spread over the week).

Materials

- The filled-in word card (above), kept where the teacher can see it.

- **Ten large food picture cards** (apple, banana, orange, grapes, carrot, bread, rice, egg, cheese, soup, or your swaps), and a cloth to cover them.
- **Small food card sets:** one set of ten per pair (printed small, or drawn).
- **Two puppets:** Bear and Rabbit (soft toys, sock or paper-bag puppets). Their likes are made up (lesson 2) and shown on the **Bear and Rabbit like cards**: one large card each, with that puppet's three liked foods ticked and three crossed, stuck on the board from lesson 2 onwards.
- **Thumbs cards:** one thumbs-up and one thumbs-down card per child (or tick and cross cards), and one **pass** card per child (a flat hand).
- **Animal friend cards** (lesson 4): two per pair, each showing an animal from the kindergarten animal words with three foods ticked and three crossed. Make at least two versions so neighbouring pairs have different answers. Also one large **Cat card** for the lesson 4 closing check (likes banana, rice, egg; doesn't like soup, bread, orange).
- **Tick and cross cards:** one of each per child (lesson 4 answers; also the thumbs alternative).
- A book or folder per pair to stand up as a screen (lesson 4).
- **Picnic basket sheets** (lesson 4): one per pair, a drawn basket with six empty spaces.
- **Café things** (lesson 5): the large food cards or play food (plastic or cloth, never real food), paper plates (two per group), a menu board with five food cards stuck on, and a small table.
- Paper and crayons for drawing a menu (lesson 5).
- **Check things** (lesson 5): six food cards, the Bear puppet, one animal friend card, a paper plate and the record sheet (class list with five columns).
- Ear defenders and a quiet spot, as in every unit.
- Optional, for blind or low-vision children: toy food to hold and tactile tick and cross cards (in every lesson).
- Optional: a fluent speaker's recording of the word-card words.

Access and inclusion

- **Speaking is optional.** Pointing, thumbs cards, signs and holding up food cards all count. Never make a child speak alone in front of others.
- **Likes are private if a child wants.** The **[pass]** card is always allowed and is never questioned. Children never have to say what they eat at home.
- **No "yuck" about food.** Some foods on the cards will be family foods for some children. "I don't like it" is fine; making faces or saying a food is horrible is not. See lesson 3.
- **Diets, religion and allergies:** some children do not eat some foods (for example egg or cheese) for health, family or religious reasons. Liking and eating are different: a child may say **[I like]** about a food they never eat, or pass. Never ask why.
- **Deaf or hard-of-hearing children:** keep your face visible; pair every word with its card or gesture.
- **Blind or low-vision children:** large, high-contrast cards; toy food they can hold, such as a toy banana; say the name as you hand it over. Tactile tick and cross cards (a raised line or a felt cross) work as thumbs cards.
- **If the language is a sign language:** the signs are the words; children sign **[I like]** / **[I don't like]** instead of using thumbs. Wherever a check says "with no gesture", sign the words with no extra pointing, thumbs or facial cue that gives the answer away.
- **Fine motor:** children who find small cards hard use the large cards, or point and a partner moves the card.
- **Children new to the school language:** keep gestures identical every time and accept answers in any language.

- **Noise:** quiet spot and ear defenders allowed, especially in the lesson 5 café.

Assessment

Lesson 5 includes a five-part check, done one-to-one (about 3 minutes each child; spread over the week). Record each part as **yes**, **with help** or **not yet**:

1. Points to the right card for four foods named with no gesture, from a row of six cards.
2. Hears (or sees signed) **[I like ___]** or **[I don't like ___]** said in Bear's voice (two turns) and shows thumbs up or down to match.
3. Says, signs or shows **[I like ___]** or **[I don't like ___]** about any food card. Choosing **[pass]** for that food and doing it for another food card counts as **yes**; a child may also show the phrase about a puppet instead of themselves.
4. Answers **[Do you like ___?]** about an animal friend card with **[yes]** or **[no]** (word, nod or tick/cross card), twice.
5. Says or shows **[please]** or **[thank you]** at the right moment in a two-line café exchange with the teacher.

Doing it in their own way (pointing, signs, thumbs cards, the child's usual access) counts as **yes**. "Not yet" is normal for some children; food words return in later units. Outcome 5 is also seen during the café role play.

Sources

- Wikipedia, "Communicative language teaching": https://en.wikipedia.org/wiki/Communicative_language_teaching (read 9 November 2026). An approach in which interaction is both the means and the goal of learning; oral activities such as role-play (usually in pairs, in a setting) and interviews. Lessons 4 and 5 use a short pair interview and a café role play.
- Wikipedia, "Information gap task": https://en.wikipedia.org/wiki/Information_gap_task (read 9 November 2026). Learners are missing information and must communicate to fill the gap; contrasted with opinion gap tasks, where learners give their own opinions. Lesson 4 is an information gap (each child has a puppet card the partner cannot see); lesson 3 is an opinion task.
- Wikipedia, "Food allergy": https://en.wikipedia.org/wiki/Food_allergy (read 9 November 2026). Common foods involved include cow's milk, peanuts, eggs, shellfish, fish, tree nuts, soy, wheat and sesame; management is mainly avoiding the food; allergens can pass between foods by cross-contact. This is why the unit uses picture cards and play food only, and why egg, cheese and bread on picture cards are fine but are never tasted.
- Wikipedia, "Total physical response": https://en.wikipedia.org/wiki/Total_physical_response . As in the kindergarten units: commands answered with actions, listening before speaking, low stress. Lessons 1 and 2 use it.
- No second-language standard or curriculum document was read for this unit.

Known gaps

- **No pronunciation help**, as in kindergarten. Use a fluent speaker's recording if needed.
- **Grammar differs:** this unit cannot say how **[I like]** works in your language (for example, whether it changes for one or many). Check with a fluent speaker.
- **Food choices are local:** the ten foods are a suggestion; some may be unfamiliar or not eaten where you teach. Swap them.

- **No standard read.**
- Peer check: Gemini 4 Argon did a bounded text, timing, link, answer-key and safety check at cc2ce21 on 9 November 2026 (not an educator or classroom review): timings sum and no errors were found; its three notes (check item 2 in first person in Bear's voice, plus a word-card row for "show me"; Bear and Rabbit like cards and low-vision options in lesson materials; "heard (or saw signed)" wording for sign-language classes) were folded in at 0b40271, which Argon also diff-checked the same day (see PEERCHECKS.md).

The lesson order matters: children understand the food words (lesson 1) and the like phrases (lesson 2) before they use them about themselves (lesson 3) or ask others (lessons 4 and 5).

Lesson 1: Ten food words

Unit overview - Next: Lesson 2: What does Bear like?

Goal: Children understand ten food words in the new language and show it by pointing to the right picture card.

Length: about 25 minutes.

Materials

- The word card.
- The ten large food picture cards and a cloth to cover them.
- One small food card set per pair (for the support and stretch games).
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: toy food to hold and tactile tick and cross cards.

Steps

✎ Opening (3 min)

Greeting chant from kindergarten (**[hello]**, **[hello]**...). Then count the large food cards together in the new language as you lay them face down: **[one]** to **[ten]**.

✎ Main activity 1: meet the foods (7 min)

Turn the cards over one at a time. Say each word twice while showing the card and doing a small eating or holding gesture: **[apple]**, **[banana]**, **[orange]**, **[grapes]**, **[carrot]**. Children copy the gesture; they do not have to say anything. Then add **[bread]**, **[rice]**, **[egg]**, **[cheese]**, **[soup]** the same way.

Stick all ten cards in a row on the board. Say a word; children point to it from their seats. Go faster, then mix the order.

✎ Main activity 2: what's missing? (8 min)

Children close their eyes (or turn around, or cover their eyes with their hands; any of these is fine). Take one card away. Children open their eyes and point to the gap or say the missing word in either language; then the teacher says it in the new language and puts it back. Play five or six rounds.

Then play "show me": say **[show me the cheese]** with an open hand; a child who wants to comes and touches the card. Nobody is "out"; if a child picks a different card, say that card's name kindly and try again together.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Which food word sounds like a word you already know?" (Any answer; in some languages some food words sound like the school-language word, for example **[banana]** in many languages.)
- "How did you remember which card was missing?" (Any answer; for example "I looked at the colours", "I said the words in my head".)

✓ Closing check (with answers) (4 min)

Mix the cards. Say four words with no gesture, one at a time: **[carrot]**, **[rice]**, **[grapes]**, **[egg]**. Children point from their seats, or a volunteer touches the card.

Answers: the carrot card, the rice card, the grapes card, the egg card.

Vocabulary

[apple], **[banana]**, **[orange]**, **[grapes]**, **[carrot]**, **[bread]**, **[rice]**, **[egg]**, **[cheese]**, **[soup]**, **[show me ___]**

Differentiation

- **Support:** start with five foods (the fruit and carrot) and add the other five in lesson 2. Children play "show me" with a partner using the small card set, picking from three cards at a time.
- **Stretch:** a child says **[show me the ___]** to a partner with the small card set, or to the class.

⚠ Safety

- No real food in this lesson; picture cards only.

Teacher notes

- Say the words the way the language really says them. If **[grapes]** is one word for one grape and another for many, use the word for a bunch.
- If you swapped foods on the word card, use the same swaps on every card set.
- For a blind or low-vision child, use a few toy objects (for example a toy banana) and say the name as you hand it over; "what's missing?" becomes "what did I take out of the box?".

Lesson 2: What does Bear like?

Unit overview - Previous: Lesson 1: Ten food words - Next: Lesson 3: I like, I don't like, pass

Goal: Children understand **[I like ___]** and **[I don't like ___]** and show which one they heard (or saw signed).

Length: about 25 minutes.

Materials

- The word card.
- The ten large food picture cards.
- The Bear and Rabbit puppets.
- The **Bear and Rabbit like cards** (one large card each, showing that puppet's three liked foods with a tick and three with a cross), stuck on the board. Make them before the lesson and put them up after main activity 2.
- One thumbs-up and one thumbs-down card per child (or tick and cross cards).
- One small food card set per pair (for the stretch game).
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: toy food to hold and tactile tick and cross cards.

Steps

✎ Opening (3 min)

Greeting chant, then a quick "show me" with the ten food cards from lesson 1.

✎ Main activity 1: Bear's likes (7 min)

Bring out Bear. Bear looks at the food cards. Hold up the apple card and make Bear hug it and do thumbs up: **[I like apple]**. Hold up the carrot card and make Bear gently push it away with thumbs down: **[I don't like carrot]**. Keep Bear calm and polite: no "yuck" faces.

Do this for six foods. Before each one, children guess with their thumbs cards; then Bear says it. Children copy Bear's thumbs.

Bear's likes are made up; keep them the same all unit. **Bear likes** apple, bread and soup; **Bear doesn't like** carrot, cheese and rice.

✎ Main activity 2: Rabbit is different (8 min)

Bring out Rabbit. Rabbit likes carrot, cheese and grapes, and doesn't like apple, egg and soup. Do the same thumbs-guess game.

Then mix them up: the teacher says **[I like ___]** or **[I don't like ___]** in Bear's or Rabbit's voice, without any gesture. Children hold up the thumbs card for what they heard (or saw signed). Nobody is "out".

Point out: Bear doesn't like carrot, but Rabbit likes carrot. "Is Bear wrong?" (No. People and puppets like different things.)

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Bear doesn't like carrot. Should Rabbit stop liking carrot?" (No; it is fine to like different things.)
- "How can you tell if someone said **[I like]** or **[I don't like]**?" (Listen for the extra word that means "don't"; the exact word depends on the language.)

✓ Closing check (with answers) (4 min)

In Bear's voice and with no gesture (in a sign language: no extra cue), say: **[I like bread]**, **[I don't like cheese]**, **[I like soup]**, **[I don't like rice]**. Children hold up a thumbs card after each.

Answers: up, down, up, down.

Vocabulary

[I like ___], **[I don't like ___]**, the ten food words.

Differentiation

- **Support:** use only **[I like]** for the first half of main activity 1; add **[I don't like]** once children are confident.
- **Stretch:** a child makes Bear or Rabbit say a like or a don't-like, with a food card from the small set, for a partner to show with thumbs.

⚠ Safety

- No real food; picture cards only.

Teacher notes

- Bear's and Rabbit's likes are made up so that nobody has to talk about their own family's food yet.
- If thumbs are rude where you teach, use tick and cross cards throughout.

Lesson 3: I like, I don't like, pass

Unit overview - Previous: Lesson 2: What does Bear like? - Next: Lesson 4: A picnic for the puppets

Goal: Children say or show **[I like ___]** or **[I don't like ___]** about food cards, or choose **[pass]**, and answer others kindly.

Length: about 25 minutes.

Materials

- The word card.
- The ten large food picture cards.
- The Bear and Rabbit puppets.
- The **Bear and Rabbit like cards** (one large card each, showing that puppet's three liked foods with a tick and three with a cross), stuck on the board.
- One thumbs-up card, one thumbs-down card and one pass card per child (or tick, cross and pass cards).
- One small food card set per pair.
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: toy food to hold and tactile tick and cross cards.

Steps

✎ Opening (3 min)

Greeting chant. Bear and Rabbit say one like each (**[I like bread]**, **[I like carrot]**); children show thumbs.

✎ Main activity 1: thumbs vote (7 min)

Teach **[pass]** with its gesture (flat hand held out): "If you don't want to say, you can always show **[pass]**. Nobody will ask why."

Then set the class rule, in the school language: "We can say **[I don't like]**. We don't say a food is horrible, and we don't make faces. Some foods are someone's favourite at home."

Hold up each large food card and say its name. Every child holds up one card: thumbs up, thumbs down, or pass. The teacher says what they see in the new language without naming anyone: "Lots of **[I like]**! Some **[I don't like]**. Some **[pass]**." Do six or seven foods.

✎ Main activity 2: partner turns (8 min)

Pairs put their small food cards face down. Child A turns one over and says or shows **[I like ___]**, **[I don't like ___]** or **[pass]**. Child B answers **[thank you]** (or a nod). Swap. Keep going until the cards run out.

A child who prefers can do the turns for Bear or Rabbit instead of themselves, using the Bear and Rabbit like cards on the board.

Walk round and model the full phrase if a child only says the food word or only shows a card; any way of answering is fine.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Your partner doesn't like a food you like. What could you say?" (Something kind or nothing at all: "That's OK", "Thank you", "I like it". Not "That's weird" or "Yuck".)
- "Why is **[pass]** always allowed?" (Some people don't want to say; some people don't eat some foods; that's their choice.)

✓ Closing check (with answers) (4 min)

In your own voice and with no gesture (in a sign language: no extra cue), say: **[I like rice]**, **[I don't like grapes]**, **[I don't like bread]**, **[I like orange]**. Children hold up a thumbs card for what they **heard** (or saw signed) (not for their own likes).

Answers: up, down, down, up.

Vocabulary

[I like ___], **[I don't like ___]**, **[pass]**, **[thank you]**, the ten food words.

Differentiation

- **Support:** the child holds up the thumbs card and the food card; the teacher or partner says the phrase, and the child nods.
- **Stretch:** the child says the full phrase without the card, or adds a second food: **[I like apple and banana]** (if the language joins them simply).

⚠ Safety

- No real food; picture cards only.

Teacher notes

- Liking and eating are different. A child who doesn't eat a food for family, religious or health reasons may still say **[I like]**, **[I don't like]** or pass. Never ask why, and never correct a child's answer about their own likes.
- Don't ask what children eat at home.
- In the closing check, children show what they heard; make that clear so nobody feels their own likes are being marked.

Lesson 4: A picnic for the puppets

Unit overview - Previous: Lesson 3: I like, I don't like, pass - Next: Lesson 5: The puppets' café

Goal: Children ask or answer **[Do you like ___?]** with **[yes]** / **[no]** to find out a made-up animal friend's likes.

Length: about 25 minutes.

Materials

- The word card.
- The ten large food picture cards and the Bear puppet.
- The **Bear and Rabbit like cards** (one large card each, showing that puppet's three liked foods with a tick and three with a cross). Keep Bear's card face down in main activity 1 and turn it over when the basket is full, to check.
- One small food card set per pair.
- **Animal friend cards:** two per pair (one for each child), each showing an animal from the kindergarten animal words with three foods ticked and three crossed. Make at least two different versions so neighbouring pairs have different answers. One large copy of the **Cat card** for the closing check: Cat likes banana, rice and egg; Cat doesn't like soup, bread and orange.
- One **picnic basket sheet** per pair (a drawn basket with six empty spaces).
- A book or folder per pair to stand up as a screen.
- One tick card and one cross card per child (or nod / shake head).
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: toy food to hold and tactile tick and cross cards.

Steps

✎ Opening (3 min)

Greeting chant. Teach **[yes]** and **[no]** with nod and head shake (or tick and cross cards), then **[Do you like ___?]** with its gesture (open hand, eyebrows up).

✎ Main activity 1: asking Bear (7 min)

Bear is going on a picnic. "What should we put in Bear's basket? Let's ask." Hold up a food card and ask Bear: **[Do you like apple?]** Bear nods: **[yes]**. Stick the apple card in the basket on the board. Ask about carrot: Bear shakes its head: **[no]**. The carrot stays out.

After two or three turns, children ask Bear the question (say it, or point to the card and do the question gesture), and the teacher answers as Bear. Bear's answers stay the same as in lesson 2 (likes apple, bread, soup; doesn't like carrot, cheese, rice).

✎ Main activity 2: the picnic game (8 min)

Pairs sit with the screen between them. Child A has an animal friend card and keeps it secret behind the screen. Child A is the animal friend now. Child B asks **[Do you like ___?]** about foods from the small card set. Child A answers **[yes]** or **[no]** using the card (not their own likes). Child B puts each "yes" food in the picnic basket. When the basket has three foods, they look at the card together: did the right foods go in? Swap roles with the second card.

Nobody is "out". If the basket has a wrong food, take it out and ask again.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "How did you find out what the animal friend likes?" (By asking **[Do you like ___?]** and listening for **[yes]** or **[no]**.)
- "Why did we use made-up animal cards and not ask about you?" (So that everyone can play, and nobody has to say their own likes.)

✓ Closing check (with answers) (4 min)

Put the large Cat card on the board. The class are Cat now. Ask: **[Do you like banana?]**, **[Do you like soup?]**, **[Do you like rice?]**, **[Do you like bread?]** Children answer for Cat with **[yes]** / **[no]** (word, nod or tick/cross card).

Answers: yes, no, yes, no.

Vocabulary

[Do you like ___?], **[yes]**, **[no]**, the ten food words.

Differentiation

- **Support:** the asker points to the food card and does the question gesture; the answerer nods or shakes their head. Use three food cards at a time, not ten.
- **Stretch:** after the basket is full, the asker tells the class what the friend likes: **[Cat likes ___]** (only if the language makes this simple; otherwise **[yes, ___]** is enough).

⚠ Safety

- No real food; picture cards only.
- Keep screens low and stable (a standing book or folder), not held up to faces.

Teacher notes

- This is an information gap: the asker cannot see the answer, so they really need to ask. It also keeps children's own likes private.
- If the animal words were different in kindergarten, use those animals.

Lesson 5: The puppets' café

Unit overview - Previous: Lesson 4: A picnic for the puppets

Goal: Children use food words, **[Do you like ___?]**, **[yes]**, **[no]**, **[please]** and **[thank you]** in a café role play. The teacher begins the one-to-one check.

Length: about 30 minutes (the check continues over the week).

Materials

- The word card.
- **Café things:** the large food cards or play food (plastic or cloth, never real food), paper plates (two per group), a menu board with five food cards stuck on, and a small table.
- The Bear and Rabbit puppets (as customers children can hold).
- Paper and crayons for drawing a menu.
- **Check cards:** six food cards, the Bear puppet, one animal friend card from lesson 4, a paper plate, and the record sheet (class list with five columns).
- Ear defenders and a quiet spot (the café can get loud).
- Optional, for blind or low-vision children: toy food to hold and tactile tick and cross cards.

Steps

✎ Opening (3 min)

Greeting chant. Teach **[please]** and **[thank you]** with their gestures.

✎ Main activity 1: the café words (5 min)

The teacher is the waiter; Bear is the customer (held by a volunteer). Model the exchange twice:

- Waiter: **[hello]**. **[Do you like soup?]**
- Customer: **[yes, please]** (or **[no, thank you]**).
- Waiter puts the soup card on a plate: **[soup]**.
- Customer: **[thank you]**. Waiter: **[goodbye]**.

The whole class says the customer's lines together, or does the gestures.

✎ Main activity 2: café time (12 min)

Groups of four. Roles: **waiter**, **cook** (puts food cards on plates), and **two customers** (as themselves, or holding Bear or Rabbit). Swap roles every 3 minutes, so most children try two or three roles.

Customers may answer for a puppet instead of themselves. Children who want a quieter job can be the cook, who only needs to understand the food words.

Walk round with the menu board, model lines, and watch for outcome 5.

Closing (10 min)

Children draw a café menu with four foods (for themselves, Bear or Rabbit), and label it in either language if they want. While they draw, begin the one-to-one check (see below) with three or four children. Finish the check over the week.

One-to-one check (with answers) (about 3 min per child)

Record each part as **yes**, **with help** or **not yet** (see the README).

1. Put six food cards in a row: apple, carrot, bread, grapes, egg, soup. Say **[bread]**, **[grapes]**, **[apple]**, **[soup]** with no gesture. Answers: the bread, grapes, apple and soup cards.
2. In Bear's voice, with no gesture: **[I like apple]**, then **[I don't like rice]**. Child shows what they heard (or saw signed). Answers: thumbs up, then thumbs down (or tick, then cross).
3. "Choose a food card. Tell me or show me **[I like]** or **[I don't like]**." Answer: any like or don't-like phrase or thumbs + card. **[Pass]** for one food plus a phrase for another, or a phrase about Bear, also counts.
4. Show one animal friend card. "You are the friend." Ask **[Do you like ___?]** about one ticked and one crossed food on it. Answers: **[yes]** for the ticked food, **[no]** for the crossed food.
5. Hold the plate: **[Do you like egg?]** Answer: **[yes, please]** or **[no, thank you]** (word, sign or gesture). Then give the plate (or not): answer **[thank you]** if a plate was given.

Vocabulary

[please], **[thank you]**, **[yes, please]**, **[no, thank you]**, **[Do you like ___?]**, **[hello]**, **[goodbye]**, the ten food words.

Differentiation

- **Support:** the child is the cook, or a customer who nods and points; the teacher or a partner says the line first.
- **Stretch:** the waiter adds a second question (**[Do you like bread too?]**) or counts the plates in the new language.

⚠ Safety

- No real food or drink in the café; play food or picture cards only. If the school wants to add real food, follow its allergy list and food rules first.
- Keep the café table steady and the floor clear of plates.

Teacher notes

- In item 5, either answer is right; the check is the polite word at the right moment.
- Item 3 is about the phrase, not the child's real likes; never question the answer.

Grade 1 Second Language: Weather, Clothes and Days of the Week (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 9 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Children never put on shared clothes in this unit: all dressing up is done with **paper clothes on a paper Bear**.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 1 year plan - Term 2

It follows Food Words and "I Like / I Don't Like" (grade 1, term 1) and the kindergarten second-language units, and uses the same idea: the teacher chooses the language and fills in a word card. The weather words link with the kindergarten science unit Senses and weather and the grade 1 science unit Patterns in the sky.

Which language?

This unit works with any language the school teaches. Before lesson 1, fill in the **word card** below. In the lessons, words in square brackets, like **[sunny]**, mean "say this in the language you are teaching". Swap any weather or clothes word for one that fits where you live (for example **[snowy]** for **[windy]**, or **[sandals]** for **[boots]**); keep six weather words and eight clothes words.

English meaning	Your language	Gesture or picture to go with it
sunny, rainy, cloudy, windy, hot, cold		weather picture cards; actions below
hat, coat, scarf, gloves, boots, T-shirt, shorts, umbrella		paper clothes for the paper Bear
Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday		seven day cards, one colour each
What's the weather? / It's ___		hand flat over eyes, looking out; then the weather card
What day is it today? / Today is ___		finger tapping the day card
Put on ___		miming pulling the item on
(review) yes, no, please, thank you, I like / I don't like, colours, numbers to ten		as in term 1 and kindergarten

Weather actions (use the same ones every time): sunny = arms make a big circle above the head; rainy = fingers wiggle downwards; cloudy = arms make a puffy shape; windy = sway like a tree; hot = fan your face; cold = hug yourself and shiver.

Grammar warning: languages say weather in very different ways (for example "it is sunny", "it makes sun", "there is sun", or one word). Say each phrase the way the language really says it.

Children only need to **understand** the phrases and **show** them; saying them is a stretch, never a requirement.

Week warning: which day counts as the first day of the week differs between countries and calendars. Start the day line and the days chant with the day your school's calendar starts with.

Big idea

In a new language we can **talk about the world around us right now**: what day it is, what the weather is like, and what to wear for it. The same few phrases can be used again every single day.

Outcomes

By the end of the unit, most children can:

1. Point to the right card for four weather words, chosen from the six, when the teacher names them, and do the matching action.
2. Point to the right paper clothes item for four clothes words, chosen from the eight.
3. Join in the days chant, and point to today's day card when asked **[What day is it today?]**.
4. Choose clothes for the paper Bear that fit a weather card (for example coat and boots for **[rainy]**), by following **[Put on ___]** or by choosing and naming or showing them.
5. Ask or answer **[What's the weather?]** about a day on a made-up weather week in a pair game.

Prior knowledge

- Food Words and "I Like / I Don't Like": the pair "screen" game, **[yes]** / **[no]**, **[please]** and **[thank you]**.
- The kindergarten units: colours, numbers to ten, classroom commands.
- Children who missed earlier units can still take part; every word has a card or an action.

Lessons

Keep the 1-minute greeting chant at the start of each day. From lesson 3 onwards, add a 2-minute **calendar and weather routine** each morning: a different helper each day turns today's day card and puts up a weather card (see lesson 3).

Lesson	Title	Time	Core idea
1	What's the weather?	25 min	Learn six weather words with cards and actions
2	Dressing the paper Bear	25 min	Learn eight clothes words and **[Put on ___]** with paper clothes
3	Seven days	25 min	Learn the days chant, **[What day is it today?]** and start the daily routine
4	Bear's weather week	25 min	Pairs ask **[What's the weather?]** to fill a made-up week, then dress Bear for one day
5	Weather reporters	30 min	Weather report role play; one-to-one check

Timings: lessons 1-4 are 25 minutes (3 + 7 + 8 + 3 + 4); lesson 5 is 30 minutes (3 + 5 + 12 + 10, with the check spread over the week).

Materials

- The filled-in word card (above), kept where the teacher can see it.
- **Six large weather cards** (sunny, rainy, cloudy, windy, hot, cold, or your swaps). For **hot** and **cold**, use pictures that do not depend on colour alone (for example a sun with a fan, a snowflake with a shivering person).
- **Small weather card sets:** one set of six per pair.
- **The paper Bear:** one large paper Bear (about 60 cm tall) for the board, with a set of **large paper clothes** (hat, coat, scarf, gloves, boots, T-shirt, shorts, umbrella) that stick on with sticky putty or Velcro dots.
- **Small paper Bears:** one per pair, each with a set of the eight small paper clothes, in an envelope.
- **Seven large day cards,** one colour each, with 1 to 7 dots in the corner so they can be told apart without colour, and a **day line** (a string or strip on the wall) to hang them on in order, with a peg or arrow to show "today".
- **Today board:** a space next to the day line with a pocket or clip for one weather card.
- **Bear's weather week sheets** (lesson 4): two per pair (one **A** sheet and one **B** sheet from the same made-up week). Each shows the five school days across the top. Sheet A has weather pictures for Monday, Wednesday and Friday and empty boxes for Tuesday and Thursday; sheet B has pictures for Tuesday and Thursday and empty boxes for the other three. Make two different weeks (lesson 4 lists both) so neighbouring pairs have different answers. Also a **large week strip** for the board (five empty day boxes) and one **large copy of Week 1**, filled in and covered with paper, for the lesson 4 closing check.
- A book or folder per pair to stand up as a screen (lesson 4).
- Crayons or pencils.
- **Reporter things** (lesson 5): a "microphone" (a cardboard tube or a block; not a real microphone shared mouth to mouth), the large weather cards, and the large paper Bear and clothes.
- **Check things** (lesson 5): six small weather cards, a small paper Bear with all eight clothes, the seven day cards, and the record sheet (class list with five columns).
- Ear defenders and a quiet spot, as in every unit.
- Optional, for blind or low-vision children: **tactile weather cards** (for example cotton wool cloud, felt raindrops, a paper fan for windy) and **cloth clothes pieces** cut from fabric scraps to put on a felt Bear (in every lesson).
- Optional: a fluent speaker's recording of the word-card words.

Access and inclusion

- **Speaking is optional.** Pointing, actions, signs and holding up cards all count. Never make a child speak alone in front of others.
- **Clothes are about the paper Bear, never about children.** Do not ask children what clothes they own or what they wore today, and do not comment on what they are wearing. Some families cannot buy coats or boots; some children wear clothes for religious or health reasons. The paper Bear wears everything.
- **Nobody dresses up.** Children do not put on shared hats, scarves or coats in this unit. "Put on" is always for the paper Bear (or mimed, if a child wants to).
- **Weather is different in different places.** If a weather word never happens where you live (for example snow), it can still be learned as a word; say "in some places".

- **Deaf or hard-of-hearing children:** keep your face visible; pair every word with its card or action.
- **Blind or low-vision children:** large, high-contrast cards; tactile weather cards and cloth clothes pieces (see Materials); say the name as you hand each one over.
- **If the language is a sign language:** the signs are the words. Wherever a check says "with no gesture", sign the word with no extra action or picture that gives the answer away.
- **Movement:** children who cannot do a weather action stand or sit and point to the card, or do it with one hand or their face; any way of showing counts.
- **Fine motor:** children who find small paper clothes hard use the large set on the board, or point and a partner moves the piece.
- **Children new to the school language:** keep gestures identical every time and accept answers in any language.
- **Noise:** quiet spot and ear defenders allowed, especially in the lesson 3 chant and lesson 5 reports.

Assessment

Lesson 5 includes a five-part check, done one-to-one (about 3 minutes each child; spread over the week). Record each part as **yes**, **with help** or **not yet**:

1. Points to the right card for four weather words named with no gesture, from a row of six cards.
2. Puts on the paper Bear the right item for four clothes words named with no gesture.
3. Points to the day card the teacher names (two turns, from all seven cards in order on the day line), and points to today's day card when asked **[What day is it today?]**.
4. Dresses the paper Bear for one weather card the teacher shows (rainy or cold): any two items that fit count (see lesson 5 for the answer list).
5. Answers **[What's the weather?]** about the teacher's weather card by saying, signing or showing the weather word or action, twice.

Doing it in their own way (pointing, signs, actions, the child's usual access) counts as **yes**. "Not yet" is normal for some children; weather and days come back every day in the morning routine.

Sources

- Wikipedia, "Week": https://en.wikipedia.org/wiki/Week (read 9 November 2026). A week is a unit of time equal to seven days; which days count as the first and last differs by culture, although virtually all have Saturday, Sunday or Monday as the first day. This is the reason for the "week warning" above.
- Wikipedia, "Total physical response": https://en.wikipedia.org/wiki/Total_physical_response . As in the kindergarten and term 1 units: commands answered with actions, listening before speaking, low stress. Lessons 1 and 2 use it (weather actions, **[Put on ___]**).
- Wikipedia, "Information gap task": https://en.wikipedia.org/wiki/Information_gap_task (read 9 November 2026 for the term 1 unit). Learners are missing information and must communicate to fill the gap. Lesson 4 is an information gap (each child has half of Bear's weather week).
- Wikipedia, "Communicative language teaching": https://en.wikipedia.org/wiki/Communicative_language_teaching (read 9 November 2026 for the term 1 unit). Interaction is both the means and the goal; role-play in pairs, in a setting. Lesson 5 uses a weather-report role play.
- No second-language standard or curriculum document was read for this unit.

Known gaps

- Written 9 November 2026. Text-checked by Gemini 4 Argon the same day (links, timings, the info-gap weeks, privacy and safety rules); its one note, that outcomes 1 and 2 asked for more words than the checks test, was fixed in eebdfed, which Gemini 4 Argon also diff-checked the same day (see PEERCHECKS.md). Not yet checked by a teacher.
- **No pronunciation help**, as in kindergarten and term 1. Use a fluent speaker's recording if needed.
- **Grammar differs:** this unit cannot say how weather phrases or **[Put on ___]** work in your language. Check with a fluent speaker.
- **Weather and clothes are local:** the words are a suggestion. Swap them for the weather and clothes children know.
- **No standard read.**
- The days chant has no tune here: chant it to a steady clap, or use a traditional days-of-the-week song in your language if the school already has one.

The lesson order matters: children understand the weather words (lesson 1), clothes words (lesson 2) and days (lesson 3) one group at a time before they combine them (lessons 4 and 5).

Lesson 1: What's the weather?

Unit overview - Next: Lesson 2: Dressing the paper Bear

Goal: Children understand six weather words and show each one with its card or action.

Length: about 25 minutes.

Materials

- The word card.
- The six large weather cards (sunny, rainy, cloudy, windy, hot, cold, or your swaps) and a cloth to cover them.
- One small weather card set per pair.
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile weather cards.

Steps

✎ Opening (3 min)

Greeting chant. Look out of the window together (or, if there is no window, show a photo of the sky outside today). Put a hand flat over your eyes and say **[What's the weather?]** in a curious voice. Do not answer yet.

✎ Main activity 1: six weather words (7 min)

Hold up each large weather card, say the word twice and do its action (see the word card). Children copy the action. Then:

- **Show me:** say a word with no card; children do the action.
- **Which card?** Do an action with no word; children point to the card.

Add one word at a time and go back to earlier ones often. Finish by answering the opening question: point to the window, say **[It's ___]** with today's weather word, and do the action.

✎ Main activity 2: what's missing? (8 min)

Put the six large cards on the board. Children close their eyes (or turn around). Cover one card with the cloth. Children open their eyes and say or show which weather is missing: the word, the action, or pointing to the matching small card in their pair set. Play five or six rounds.

Then pairs play with their small sets: one child hides a card under their hand and does its action; the partner points to the matching card from the rest. Swap.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Why do we do an action for every word?" (It helps us remember, and everyone can answer without speaking.)
- "Is the weather the same every day?" (No. It changes, and it is different in different places.)

✓ Closing check (with answers) (4 min)

Say each word with no gesture and no card; children do the action: **[rainy]**, **[hot]**, **[windy]**, **[cloudy]**.

Answers: fingers wiggling down; fanning the face; swaying; puffy arms.

Vocabulary

[sunny], **[rainy]**, **[cloudy]**, **[windy]**, **[hot]**, **[cold]**, **[What's the weather?]**, **[It's ___]**.

Differentiation

- **Support:** use three cards at a time (sunny, rainy, cold) before adding the rest; children point rather than act.
- **Stretch:** children say **[It's ___]** for a card the teacher holds up, or lead "Show me" for the class.

⚠ Safety

- Never look straight at the Sun when looking out of the window.
- Leave space between children for the swaying and big-circle actions.

Teacher notes

- Keep the actions exactly the same in every lesson; they become the answers in the lesson 5 check.
- If **[hot]** and **[cold]** are not "weather words" in your language (for example they need a different verb), teach the phrase the language really uses.

Lesson 2: Dressing the paper Bear

Unit overview - Previous: Lesson 1: What's the weather? - Next: Lesson 3: Seven days

Goal: Children understand eight clothes words and **[Put on ___]**, and dress a paper Bear when they hear them.

Length: about 25 minutes.

Materials

- The word card.
- The six large weather cards.
- The large paper Bear on the board, with its eight large paper clothes (hat, coat, scarf, gloves, boots, T-shirt, shorts, umbrella) and sticky putty or Velcro dots.
- One small paper Bear per pair, with its eight small paper clothes in an envelope.
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile weather cards, and cloth clothes pieces with a felt Bear.

Steps

✎ Opening (3 min)

Greeting chant. Quick weather review: say three weather words; children do the actions. Then introduce the paper Bear: "Bear is going outside. Bear needs clothes!"

✎ Main activity 1: eight clothes words (7 min)

Hold up each large paper clothes item, say the word twice, and mime pulling it on yourself (hat on head, gloves on hands). Children copy the mime. Then put it on the board Bear while saying **[Put on ___]**.

After all eight, take them all off. Say **[Put on hat]**, **[Put on boots]** and so on; a different child each time puts the item on the board Bear (or points and the teacher does it).

✎ Main activity 2: dress your Bear (8 min)

Pairs open their envelopes and lay the small clothes out. The teacher says **[Put on ___]** for one item at a time; pairs take turns putting it on their small Bear. Check by holding up the large item after each one.

Then take everything off and play with weather: hold up a weather card (rainy) and say **[It's rainy. Put on coat. Put on boots.]**, with the umbrella as a bonus. Do two more weather cards (cold: hat, scarf, gloves, coat; hot or sunny: T-shirt, shorts, hat).

✓ Discussion questions (with answers) (3 min)

In the school language:

- "What did Bear wear when it was rainy?" (Coat and boots; the umbrella too. Other answers that keep Bear dry are fine.)
- "Why did Bear take off the coat when it was hot?" (So Bear would not be too hot.)

✓ Closing check (with answers) (4 min)

Take everything off the board Bear. Say with no gesture: **[Put on scarf]**, **[Put on shorts]**, **[Put on gloves]**, **[Put on umbrella]** (or the right verb for an umbrella in your language, such as "take"). Children point to the right item in their pair set, then one child puts it on the board Bear.

Answers: scarf, shorts, gloves, umbrella.

Vocabulary

[hat], **[coat]**, **[scarf]**, **[gloves]**, **[boots]**, **[T-shirt]**, **[shorts]**, **[umbrella]**, **[Put on ___]**.

Differentiation

- **Support:** start with four items (hat, coat, boots, umbrella); the child points and a partner moves the piece.
- **Stretch:** the child says **[Put on ___]** to their partner, who dresses the small Bear.

⚠ Safety

- Children do not put on shared clothes. Mimes and the paper Bear only.
- Use sticky putty or Velcro dots, not pins.

Teacher notes

- Talk only about Bear's clothes. Do not ask children about their own clothes or what they have at home (see Access and inclusion in the unit overview).
- Many languages use a different verb for an umbrella ("take", "open", "hold"). Use the real one; children only need to show it.

Lesson 3: Seven days

Unit overview - Previous: Lesson 2: Dressing the paper Bear - Next: Lesson 4: Bear's weather week

Goal: Children join in a days chant, point to day cards when they are named, and show today's day.

Length: about 25 minutes.

Materials

- The word card.
- The seven large day cards, one colour each, with **1 to 7 dots** in the corner so they can be told apart without colour (one dot for the first day of your school's week).
- The day line (string or wall strip) with pegs, and a "today" peg or arrow.
- The today board and the six large weather cards.
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: day cards with raised dots (for example glued lentils or puffy paint) and tactile weather cards.

Steps

✎ Opening (3 min)

Greeting chant. Weather review: hold up three weather cards; children do the actions.

✎ Main activity 1: the days chant (7 min)

Hang the seven day cards on the day line in order, starting with the day your school's calendar starts with. Point to each one, say it twice, and count its dots with the children.

Chant the seven days to a steady clap (clap, clap, say the day). Do it three times: teacher alone, then with children joining in, then quietly ("whisper days"). Children who do not want to speak can clap or point along the line.

✎ Main activity 2: what day is it today? (8 min)

Ask **[What day is it today?]** while tapping the day line. Move the "today" peg to today's card and say **[Today is ___]**.

Then play **Jump to the day:** say a day name with no gesture; children point to it on the line (or hold up that many fingers, the number of dots). Five or six rounds, mixing the order.

Finish by starting the **morning routine**: one helper moves the "today" peg, then the class looks outside, and the helper puts the matching weather card on the today board. Everyone

says or shows **[Today is ___. It's ___.]** From now on, do this for 2 minutes every morning, with a different helper each day.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "How many days are in a week?" (Seven.)
- "Which days do we come to school?" (Answer for your school, for example the five school days; the others are home days.)

✓ Closing check (with answers) (4 min)

Say three day names with no gesture, out of order; children point to each on the day line. Then ask **[What day is it today?]**; children point to today's card.

Answers: the three cards named, then today's card.

Vocabulary

[Monday] to **[Sunday]**, **[What day is it today?]**, **[Today is ___]**.

Differentiation

- **Support:** children point along the line with the chant rather than saying the days; use only the school days at first.
- **Stretch:** children say the day after today, or lead the chant.

⚠ Safety

- Hang the day line at a height children can reach without standing on chairs.

Teacher notes

- Do not ask what children do on home days, or where they go; keep "home days" general.
- Day names may be capitalised or not, depending on the language. Write them the way the language does.

Lesson 4: Bear's weather week

Unit overview - Previous: Lesson 3: Seven days - Next: Lesson 5: Weather reporters

Goal: Children ask or answer **[What's the weather?]** about days of a made-up week, then dress Bear for one of those days.

Length: about 25 minutes.

Materials

- The word card, the day line and the six large weather cards.
- The large paper Bear and its eight large paper clothes.
- **Bear's weather week sheets:** two per pair (one **A** sheet and one **B** sheet from the same week). Make two different weeks so neighbouring pairs have different answers:
  - **Week 1:** Monday sunny, Tuesday rainy, Wednesday cloudy, Thursday windy, Friday cold.
  - **Week 2:** Monday rainy, Tuesday sunny, Wednesday cold, Thursday cloudy, Friday windy.
  - Sheet A shows the pictures for Monday, Wednesday and Friday, with empty boxes for Tuesday and Thursday. Sheet B shows Tuesday and Thursday, with empty boxes for Monday, Wednesday and Friday.
- A **large week strip** for the board, with five empty day boxes (main activity 1).
- One **large copy of Week 1** (all five days filled in), covered with paper, for the closing check.
- One small weather card set per pair (to place in empty boxes instead of drawing, if a child prefers).
- One small paper Bear with its clothes per pair.
- A book or folder per pair to stand up as a screen.
- Crayons or pencils.
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile weather cards placed on a large-print week sheet, and cloth clothes pieces with a felt Bear.

Steps

✎ Opening (3 min)

Greeting chant and the morning routine (today's day and weather). Point to the five school days on the day line and say them.

✎ Main activity 1: asking about Bear's week (7 min)

Show a large week strip with Monday to Friday and only Monday filled in (sunny). Point to Tuesday and ask Bear (the teacher in Bear's voice): **[Tuesday? What's the weather?]** Bear answers **[It's rainy]** and does the action. Draw or stick the rainy card in Tuesday's box. Do two more days the same way.

Then children ask Bear about the last day (say it, or point to the day and do the "What's the weather?" gesture), and Bear answers.

✎ Main activity 2: the weather week game (8 min)

Pairs sit with the screen between them. Child A has sheet A, child B has sheet B, from the same week. Child A points to or says an empty day on their sheet and asks **[What's the weather?]**. Child B looks at their own sheet and answers with the word, the action or by holding up the small weather card. Child A draws the weather or puts the small card in the box. Then child B asks about their empty days. When both sheets are full, take the screen away and compare: are they the same?

Then pairs choose one day on their sheet and dress their small paper Bear for that weather.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "How did you find out the weather on the empty days?" (By asking **[What's the weather?]** and listening to, or watching, our partner.)
- "Which clothes did your Bear wear on a cold day?" (For example coat, hat, scarf, gloves, boots. Any clothes that keep Bear warm are fine.)

✓ Closing check (with answers) (4 min)

Uncover the large copy of Week 1. Ask with no gesture: **[Thursday? What's the weather?]**, then **[Monday? What's the weather?]**. Children answer with the word or action. Then point to Friday and ask, in the school language, "What should Bear put on?"; children name or show clothes and one child dresses the board Bear.

Answers: windy; sunny; for Friday (cold), any warm clothes: coat, hat, scarf, gloves, boots.

Vocabulary

[What's the weather?], **[It's ___]**, the six weather words, the five school-day names, the eight clothes words.

Differentiation

- **Support:** the asker only points to the empty day and does the question gesture; the answerer holds up the small weather card.
- **Stretch:** the asker says the whole question with the day name; after the game, the pair tells the class about one day: **[Tuesday. It's rainy. Put on coat.]**

⚠ Safety

- Keep screens low and stable (a standing book or folder), not held up to faces.

Teacher notes

- This is an information gap: each child has half of the week, so they really need to ask.
- In some languages, "on Tuesday" needs a small extra word. Children can just say the day name.

Lesson 5: Weather reporters

Unit overview - Previous: Lesson 4: Bear's weather week

Goal: Children give or follow a short weather report (day, weather, what Bear should put on) in a role play; the one-to-one check happens during the week.

Length: about 30 minutes.

Materials

- The word card, the day line and the today board.
- The six large weather cards, and one small weather card set per group of three.
- The large paper Bear and its eight large paper clothes.
- One small paper Bear with its clothes per group of three.
- **Reporter "microphones":** one per group (a cardboard tube or a block). Each child holds it in front of them; nobody puts it to their mouth.
- **Check things:** six small weather cards, a small paper Bear with all eight clothes, the seven day cards on the day line, and the record sheet (class list with five columns).
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile weather cards and cloth clothes pieces with a felt Bear.

Steps

✎ Opening (3 min)

Greeting chant and the morning routine (today's day and weather).

✎ Main activity 1: the teacher's weather report (5 min)

Hold the microphone and give a report in the language, with actions and cards: **[Today is ___.]** (point to the day line) **[It's rainy.]** (action, card) **[Put on coat! Put on boots!]** A child dresses the large paper Bear. Do one more report with a different weather card. Then let two volunteers (only volunteers) give a report with the teacher's help; pointing to cards counts.

✎ Main activity 2: reporters, dressers and checkers (12 min)

Groups of three. Roles: the **reporter** holds the microphone, picks a small weather card without showing it, then reports it (word, action or card) and says or shows what to put on; the **dresser** puts clothes on the small paper Bear; the **checker** looks at the weather card and says or shows **[yes]** if the clothes fit, or helps fix them. Swap roles every 4 minutes so everyone has each role.

Nobody is "out". Any clothes that fit the weather count.

Closing: class reports and check (with answers) (10 min)

Groups that want to show the class give one report (opt-in; a group can choose not to). Then the whole-class check: hold up the rainy card and ask **[What's the weather?]**; children answer with the word or action. Ask, in the school language, "What should Bear put on?"; children point to items for the board Bear.

Answers: rainy; any of coat, boots, umbrella, hat.

During the rest of the week, do the one-to-one check (about 3 minutes each child, see below).

One-to-one check

Record each part as **yes**, **with help** or **not yet**:

1. Lay out the six small weather cards. Name four, with no gesture; the child points to each.
2. Name four clothes items with no gesture: **[Put on ___]**; the child puts each on the small paper Bear.
3. Name two day cards on the day line with no gesture; the child points to each. Then ask **[What day is it today?]**; the child points to today's card.
4. Show the rainy card or the cold card and say, in the school language, "Dress Bear for this weather." Any two items that fit count:
    - **Rainy:** coat, boots, umbrella, hat.
    - **Cold:** coat, hat, scarf, gloves, boots.
5. Show a weather card and ask **[What's the weather?]**; the child says, signs or shows the word or action. Do this twice with different cards.

Doing it in their own way (pointing, signs, actions, the child's usual access) counts as **yes**.

Vocabulary

All the unit's words: six weather words, eight clothes words, seven day names, **[What's the weather?]**, **[It's ___]**, **[What day is it today?]**, **[Today is ___]**, **[Put on ___]**.

Differentiation

- **Support:** the reporter only holds up the weather card and does the action; the teacher joins that group.
- **Stretch:** the reporter gives the whole report, including the day, and adds **[I like ___]** about the weather, or **[pass]**.

⚠ Safety

- Microphones are never shared mouth to mouth; children hold them in front of them.
- Quiet spot and ear defenders allowed; reports can be quiet.

Teacher notes

- Keep the daily morning routine going after the unit. It gives every child a short, safe turn with the words every day.

- If a child gives a report about the real weather outside, that is fine; the paper Bear still does the dressing.

Grade 1 Second Language: A Picture Story with Yes/No and "Who?" Questions (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 10 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. No real food is used or tasted in this unit: the picnic food is picture cards or play food only.
>
> Text-checked by two other agents (GLM-5.3 Flash, Gemini 4 Argon); see Known gaps.

Back to the grade 1 year plan - Term 3

It follows Weather, Clothes and Days of the Week (grade 1, term 2) and Food Words and "I Like / I Don't Like" (grade 1, term 1), and uses the same idea: the teacher chooses the language and fills in a word card. The story reuses words children already know (food words from term 1, weather words and **[umbrella]** from term 2, **[duck]** from kindergarten), so most of the new learning is in **listening to a whole story** and **answering questions about it**.

Which language?

This unit works with any language the school teaches. Before lesson 1, fill in the **word card** below. In the lessons, words in square brackets, like **[Duck has an apple]**, mean "say this in the language you are teaching". You may swap a food for another food from the term 1 unit; keep three foods.

English meaning	Your language	Gesture or picture to go with it
bear, duck, hen, mouse		the four character cards; actions below
___ has ___		both hands hug an invisible thing to the chest
happy, sad		happy: big smile, both hands up; sad: one finger draws a tear down the cheek
Who?		palms up, shoulders up, looking left and right
basket		basket card or prop
Oh no!		hands on cheeks
The end		close both hands like shutting a book
(review) apple, bread, cheese, sunny, rainy, umbrella, yes, no, thank you		as in terms 1 and 2

Character actions (use the same ones every time): **bear** = slow, heavy steps with big paws; **duck** = waddle, or a beak made with one hand (as in kindergarten); **hen** = peck with the head and tuck the hands in like wings; **mouse** = two fingers make whiskers by the nose.

Grammar warning: languages say "has" in very different ways (for example "Duck has an apple", "with Duck is an apple", "Duck's apple", or a word that changes with the thing). Yes/no questions are also made differently (a special word, a change in word order, or just a questioning

voice). Say each sentence the way the language really says it. Children only need to **understand** the sentences and **show** their answers; saying them is a stretch, never a requirement.

Gesture warning: as in term 1, if thumbs up or thumbs down is rude where you live, use the tick and cross cards (or the school's usual signs for yes and no) everywhere this unit says "yes or no".

The story: "Bear's Picnic"

This is an original story written for this unit (an example, not from a source; CC0, free to change). It uses the characters of Little Hill, who also appear in other units of these drafts. Tell it with the six large story cards, one sentence group per card, and the actions in brackets.

1. **[It's sunny.]** (sun action) **[Bear has a basket.]** (has action) **[Bear is happy.]** (happy action)
2. **[Duck comes. Duck has an apple.] [Thank you, Duck!]**
3. **[Hen comes. Hen has bread.] [Thank you, Hen!]**
4. **[Mouse comes. Mouse has cheese.] [Thank you, Mouse!]**
5. **[Oh no! It's rainy!]** (rain action) **[Bear is sad. Hen is sad. Mouse is sad.] [Duck is happy!]** (Duck likes rain.)
6. **[Bear has an umbrella!] [Bear, Duck, Hen and Mouse are happy.] [The end.]**

Picture cards (draw them simply; any style is fine): card 1 Bear with a basket under the sun; card 2 Duck holding an apple; card 3 Hen holding bread; card 4 Mouse holding cheese; card 5 rain, with Bear, Hen and Mouse looking sad and Duck smiling; card 6 all four friends under one big umbrella, smiling. Draw sad and happy faces clearly (mouth shape **and** a tear for sad), not by colour.

Big idea

A story in a new language can be understood **before we know every word**: pictures, actions and words we already know carry the meaning. Questions like **[Who?]** and yes/no questions help us show what we understood, and we can **tell the story back** with pictures, actions and a few words.

Outcomes

By the end of the unit, most children can:

1. Point to the right character card when the teacher names each of the four characters (bear, duck, hen, mouse).
2. Answer yes/no questions about a story card, by saying, signing or showing **[yes]** or **[no]**.
3. Answer **[Who?]** questions about the story (for example **[Who has the bread?]**) by pointing to, naming or showing the right character.
4. Put story cards in the order of the story.
5. Retell the story with the cards, giving at least one word, sign or action for each card.

Prior knowledge

- Food Words and "I Like / I Don't Like": **[apple]**, **[bread]**, **[cheese]**, **[yes]**, **[no]**, **[thank you]**, the tick and cross cards.

- Weather, Clothes and Days of the Week: **[sunny]**, **[rainy]**, **[umbrella]**, the weather actions and the paper Bear.
- Numbers to Ten, Colours and Animals Through Games (kindergarten): **[duck]** and its action.
- Children who missed earlier units can still take part; every word has a card or an action.

Lessons

Keep the 1-minute greeting chant and the term 2 calendar and weather routine at the start of each day.

Lesson	Title	Time	Core idea
1	Bear and friends	25 min	Learn the four characters, **[has]**, **[happy]** and **[sad]** with cards, actions and props
2	Listening to "Bear's Picnic"	25 min	Hear the whole story with cards and actions; answer yes/no questions
3	Who?	25 min	Answer **[Who?]** questions about the story; the "Who has it?" pair game
4	Telling it back	25 min	Spot the teacher's mistakes; put the cards in order and retell in pairs
5	Our picnic show	30 min	Groups act the story while the teacher tells it; one-to-one check

Timings: lessons 1-4 are 25 minutes (3 + 7 + 8 + 3 + 4); lesson 5 is 30 minutes (3 + 5 + 12 + 10, with the check spread over the week).

Materials

- The filled-in word card (above), kept where the teacher can see it.
- **Six large story cards** (see "The story" above), numbered 1 to 6 on the back.
- **Four large character cards** (Bear, Duck, Hen, Mouse), one character each, big enough to see from the back of the room. Characters are told apart by shape and drawing, not by colour alone.
- **Character props:** the large paper Bear from term 2 (or the Bear character card), and three more large character figures or cards (Duck, Hen, Mouse) that can sit on chairs at the front. If the class made Duck, Hen and Mouse stick puppets in the grade 1 arts unit A Story with Stick Puppets and a Class Show, you may borrow them.
- **Picnic props:** a basket (a small box or bag will do), and a play-food or card **apple**, **bread** and **cheese**, plus the large paper **umbrella** from the term 2 paper clothes. Play food must be too big to fit in a child's mouth.
- **Small character card sets:** one set of four (Bear, Duck, Hen, Mouse) per pair.
- **Small food cards:** one apple, one bread and one cheese card per pair (lesson 3), from the term 1 sets.
- **Small story card sets:** one set of the six story cards per pair (lessons 4 and 5).
- **Tick and cross cards:** one of each per child, as in term 1.
- Paper and crayons for each child (lesson 5).
- **Show things** (lesson 5): the large character cards or puppets, the picnic props and the large story cards.
- **Check things** (lesson 5): one set of four small character cards, story cards 1, 2, 5 and 6 from a small set, the large story cards 2, 3 and 5 (or small ones), one tick and one cross card, and the record sheet (class list with five columns).

- Ear defenders and a quiet spot, as in every unit.
- Optional, for blind or low-vision children: **tactile character cards** (Bear = a fleece circle; Duck = a smooth plastic or laminated beak shape; Hen = a bumpy corrugated card shape; Mouse = a small felt shape with string whiskers) and **tactile story cards** with one raised object each (card 1 a felt sun and a card basket; card 2 a felt apple; card 3 felt bread; card 4 a felt cheese wedge; card 5 felt raindrops; card 6 a folded paper umbrella). Use them in every lesson and in the check.
- Optional: a fluent speaker's recording of the story.

Access and inclusion

- **Speaking is optional.** Pointing, actions, signs and holding up cards all count. Never make a child speak, act or retell alone in front of others.
- **Feelings belong to the characters.** Talk only about whether Bear, Duck, Hen or Mouse is happy or sad, and why they might feel that way. Do not ask children whether they are happy or sad, or about their own feelings.
- **No questions about home.** Do not ask children about picnics, what they eat at home, or what their families have. The story is about Bear and friends only.
- **No real food.** Picture cards or play food only; nothing is tasted (see the term 1 unit for allergies).
- **Deaf or hard-of-hearing children:** keep your face visible; tell the story slowly with every card and action; point to the character you are talking about.
- **Blind or low-vision children:** large, high-contrast cards; the tactile character and story cards (see Materials); say the character's name as you hand each card over. In **[Who?]** questions they touch and hold up the right tactile character card.
- **If the language is a sign language:** the signs are the words. Wherever a check says "with no gesture", sign the sentence with no extra action, pointing or picture that gives the answer away.
- **Movement:** children who cannot do an action stand or sit and point to the card, or do it with one hand or their face; any way of showing counts.
- **Fine motor:** children who find small cards hard use the large cards, or point and a partner moves the card.
- **Children new to the school language:** keep gestures identical every time and accept answers in any language.
- **Noise:** quiet spot and ear defenders allowed, especially in the lesson 5 show.

Assessment

Lesson 5 includes a five-part check, done one-to-one (about 3 minutes each child; spread over the week). Record each part as **yes**, **with help** or **not yet**:

1. Points to the right character card for each of the four characters, named with no gesture, from the four small character cards in a shuffled row.
2. Answers three yes/no questions about story cards, with no gesture: card 2 **[Does Duck have an apple?]** (yes); card 3 **[Does Hen have cheese?]** (no); card 5 **[Is it sunny?]** (no).
3. Answers three **[Who?]** questions by pointing to, naming or showing a character card: **[Who has the cheese?]** (Mouse); **[Who is happy in the rain?]** (Duck); **[Who has the basket?]** (Bear).
4. Puts story cards 1, 2, 5 and 6 (shuffled) in story order.

5. Retells with those four cards in order: gives one word, sign or action that fits each card (for example sunny or basket; Duck or apple; rainy, sad or "Oh no!"; umbrella or happy).

Doing it in their own way (pointing, signs, actions, the child's usual access) counts as **yes**. "Not yet" is normal for some children; the story can be told again any time.

Sources

- NCSSFL-ACTFL Can-Do Statements, Novice: https://www.actfl.org/uploads/files/general/Resources-Publications/Can-Do-Novice.pdf (read 10 November 2026). These are performance indicators and examples, not a curriculum. Lines used for this unit: Novice Low interpretive, fictional texts: "I can identify memorized or familiar words in short, straightforward fictional texts and media that are supported by gestures, facial expressions, or visuals", with examples "I can recognize a few individual words of a read aloud story", "I can recognize a character's name in a folk tale" and "I can recognize common opening and closing words in oral storytelling" (outcome 1 and **[The end]**). Novice Low interpersonal: "I can provide information by answering a few simple questions on very familiar topics, using practiced or memorized words and phrases with the help of gestures, facial expressions, or visuals" (outcomes 2 and 3). Novice Mid example: "I can recognize some events from a story timeline" (outcome 4, a stretch for some children).
- Wikipedia, "TPR Storytelling": https://en.wikipedia.org/wiki/TPR_Storytelling (read 10 November 2026). A method that teaches a few phrases with gestures, uses them in a spoken class story, and keeps vocabulary limited, often to three new phrases or fewer per lesson; its "circling" questions include yes questions, no questions, either/or questions and "wh" questions; after the story the teacher may retell it briefly, retell it with errors for students to correct, or ask students to retell it. This unit borrows these ideas (three new phrases: **[has]**, **[happy]**, **[sad]**; yes/no and **[Who?]** questions; retelling with mistakes in lesson 4). It is **not** a TPRS course (TPRS is trademarked and taught at its own workshops), and it leaves out the method's "personalized questions", because these lessons never ask about children's own lives.
- Wikipedia, "Total physical response": https://en.wikipedia.org/wiki/Total_physical_response . As in earlier units: commands answered with actions, listening before speaking, low stress.

Known gaps

- Written 10 November 2026. Text-checked the same day by GLM-5.3 Flash (two ACTFL quotes corrected in ea83406) and Gemini 4 Argon (no errors; two optional tactile-card notes for lessons 2 and 4, applied); see PEERCHECKS.md. Not yet reviewed by a teacher.
- **No pronunciation help**, as in earlier units. Use a fluent speaker's recording if needed.
- **Grammar differs:** this unit cannot say how "has", yes/no questions or **[Who?]** work in your language. Check with a fluent speaker.
- The Can-Do Statements describe what learners can do at each level; they do not say what a grade 1 class should learn in a term, so the choices here are the author's.
- The story is short and made up. A real picture book in the language, read with the same questions, may be better if the school has one.

The lesson order matters: children meet the characters and new phrases (lesson 1) before hearing the whole story (lesson 2), answer harder questions (lesson 3) before telling it back (lesson 4), and only then act it and do the check (lesson 5).

Lesson 1: Bear and friends

Unit overview - Next: Lesson 2: Listening to "Bear's Picnic"

Goal: Children understand the names of the four story characters and the three new phrases **[___ has ___]**, **[happy]** and **[sad]**, and show them with actions and props.

Length: about 25 minutes.

Materials

- The word card.
- The four large character cards (Bear, Duck, Hen, Mouse).
- The character props: the large paper Bear (or Bear card) and the Duck, Hen and Mouse figures or cards, sitting on four chairs at the front.
- The picnic props: a basket, a play-food or card apple, bread and cheese, and the large paper umbrella. Play food must be too big to fit in a child's mouth.
- One small character card set (four cards) per pair.
- Ear defenders and a quiet spot.
- Optional: the tactile character cards, and the play food (which can be felt) for blind or low-vision children.

Steps

✎ Opening (3 min)

Greeting chant and the morning routine. Show the paper Bear: **[Hello, Bear!]** Say in the school language: "Bear has some friends. Let's meet them."

✎ Main activity 1: meet the friends (7 min)

Hold up each character card in turn, say its name in the new language and do its action: **[bear]** (slow heavy steps), **[duck]** (waddle or beak hand), **[hen]** (peck, hands tucked like wings), **[mouse]** (finger whiskers). Children copy the action each time. Repeat each name three or four times.

Then play "Show me": say a name with no card raised (**[Hen!]**); children do the action. Then point to a card on the chairs and children do that action. Mix the order. Keep it quick and playful.

✎ Main activity 2: who has what? (8 min)

Hand the basket to the paper Bear and say **[Bear has a basket]**, doing the "has" action (both hands hug an invisible thing to the chest). Children copy. Then give the apple to Duck (**[Duck has an apple]**), the bread to Hen, the cheese to Mouse. Children do the "has" action each time.

Now do **[happy]** and **[sad]**: make Bear look happy (big smile, hands up) - **[Bear is happy]**. Take the basket away - **[Oh no! Bear is sad]** (finger draws a tear). Give it back - **[Bear is happy!]** Children do the happy and sad actions with you. Do the same with one other character.

Then give the props out again in a new order, saying each sentence, and let a helper child move one prop as you say it: **[Mouse has the apple]**. Children who prefer not to come up point from their seats.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "How did you know which friend I was talking about, even before you knew the words?" (From the cards, the actions, where I pointed.)
- "Why might Bear be sad when the basket goes away?" (Bear might want the basket, or the food in it. Any kind answer is fine.)

✓ Closing check (with answers) (4 min)

Pairs lay their four small character cards face up. With no gesture and no pointing, say each name in a new order: **[mouse]**, **[bear]**, **[hen]**, **[duck]**. Each child points to, holds up or touches the card. Then say, with no gesture, **[Duck is sad]**: children do the sad action.

Answers: the Mouse card, the Bear card, the Hen card, the Duck card; the sad action (finger drawing a tear).

Vocabulary

[bear], **[duck]**, **[hen]**, **[mouse]**, **[___ has ___]**, **[happy]**, **[sad]**, **[basket]**, **[Oh no!]**; review **[apple]**, **[bread]**, **[cheese]**.

Differentiation

- **Support:** a child holds one character card for the whole lesson and stands up (or waves the card) when that name is said.
- **Stretch:** a child says a whole sentence for the helper to act out, for example **[Hen has the cheese]**.

⚠ Safety

- Play food is too big to fit in a mouth and is never tasted.
- Helpers walk to the chairs; keep a clear path at the front.

Teacher notes

- Only three new phrases are taught (**[has]**, **[happy]**, **[sad]**); the character names are new words but have strong actions. Keep everything else in words children already know.
- Feelings are always Bear's or the friends' feelings, never the children's.

Lesson 2: Listening to "Bear's Picnic"

Unit overview - Previous: Lesson 1: Bear and friends - Next: Lesson 3: Who?

Goal: Children listen to the whole story with cards and actions, join in the actions, and answer yes/no questions about the story cards.

Length: about 25 minutes.

Materials

- The word card, with the story (see the unit overview).
- The six large story cards, in order.
- The four large character cards.
- The picnic props (basket, play-food or card apple, bread and cheese, large paper umbrella).
- A tick card and a cross card for each child.
- Ear defenders and a quiet spot.
- Optional: the tactile story cards and tactile character cards for blind or low-vision children (hand each one over as its card is told).

Steps

✎ Opening (3 min)

Greeting chant and the morning routine. Quick "Show me" with the four character names and actions from lesson 1, then **[happy]** and **[sad]**.

✎ Main activity 1: the story, twice (7 min)

Say in the school language: "Here is a story about Bear. Watch the pictures. You don't need to know every word."

First telling: tell "Bear's Picnic" slowly, holding up each story card and pointing to the character as you name them. Children only watch and listen.

Second telling: tell it again. This time children join in the actions: the sun action, "has", happy, sad, the rain action, **[Oh no!]** (hands on cheeks), and the "The end" action (closing hands like a book).

✎ Main activity 2: yes or no? (8 min)

Hold up a story card and ask a yes/no question about it. Children answer with the tick or cross card (or nod or shake their head, or say **[yes]** / **[no]**). After each answer, say the right sentence and do its action, so children hear it again.

Questions, with answers:

1. Card 1: **[Is it sunny?]** (yes)

2. Card 1: **[Is it rainy?]** (no)
3. Card 2: **[Does Duck have an apple?]** (yes)
4. Card 3: **[Does Hen have an apple?]** (no - Hen has bread)
5. Card 4: **[Does Mouse have cheese?]** (yes)
6. Card 5: **[Is Bear happy?]** (no - Bear is sad)
7. Card 5: **[Is Duck happy?]** (yes - Duck likes rain)
8. Card 6: **[Does Bear have an umbrella?]** (yes)

If most children answer well, a child (who wants to) can hold up a card and the teacher asks the class about it.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Why might Duck be happy in the rain when the others are sad?" (Ducks like water; Duck does not mind getting wet.)
- "How did the story end?" (Bear had an umbrella, so everyone was happy.)

✓ Closing check (with answers) (4 min)

Hold up a story card and ask with no gesture. Children answer with tick or cross cards. Blind or low-vision children are handed the matching tactile story card at the same time, so they can answer by touch:

- Card 1: **[Is it rainy?]**
- Card 4: **[Does Mouse have cheese?]**
- Card 6: **[Is Bear sad?]**

Answers: no; yes; no.

Vocabulary

The story sentences; yes/no questions such as **[Is it ___?]** and **[Does ___ have ___?]**; **[Oh no!]**, **[The end]**; review **[yes]**, **[no]**, **[sunny]**, **[rainy]**, **[umbrella]**.

Differentiation

- **Support:** a child holds the story card for each question and looks at it closely, or answers only the questions about one character.
- **Stretch:** a child answers a "no" question with the right sentence, for example **[No. Hen has bread.]**

⚠ Safety

- Play food is too big to fit in a mouth and is never tasted.

Teacher notes

- Yes/no questions are the easiest kind to answer in a new language: children only need to understand and choose.
- Ask some questions whose answer is "no", so children cannot just say "yes" every time.
- Children do not need to answer the discussion questions in the new language.

Lesson 3: Who?

Unit overview - Previous: Lesson 2: Listening to "Bear's Picnic" - Next: Lesson 4: Telling it back

Goal: Children answer **[Who?]** questions about the story by pointing to, naming or showing the right character, and play a pair game with **[Who has the ___?]**.

Length: about 25 minutes.

Materials

- The word card, with the story.
- The six large story cards.
- The four large character cards.
- One small character card set (four cards) per pair.
- One small apple, bread and cheese card per pair (from the term 1 sets).
- A tick card and a cross card for each child.
- Ear defenders and a quiet spot.
- Optional: the tactile character cards and tactile story cards for blind or low-vision children; a felt apple, bread and cheese for the pair game.

Steps

✎ Opening (3 min)

Greeting chant and the morning routine. Tell "Bear's Picnic" once with the story cards; children do the actions.

✎ Main activity 1: who? (7 min)

Teach **[Who?]** with its gesture (palms up, shoulders up, looking left and right). Put the four large character cards in a row on the board.

Hold up a story card, ask a **[Who?]** question, and let children point to the right character card on the board (or name it, or do its action). Then say the answer sentence with the "has" action.

Questions, with answers:

1. Card 1: **[Who has a basket?]** (Bear)
2. Card 2: **[Who has an apple?]** (Duck)
3. Card 3: **[Who has bread?]** (Hen)
4. Card 4: **[Who has cheese?]** (Mouse)
5. Card 5: **[Who is happy in the rain?]** (Duck)
6. Card 6: **[Who has an umbrella?]** (Bear)

Then ask the same questions **without** holding up the story card, in a new order. Children point to the character on the board.

✎ Main activity 2: the "Who has it?" game (8 min)

Pairs lay their four small character cards face up in a row. Child A takes the apple card. Child B closes their eyes (or turns around). Child A hides the apple card under one character card.

Child B asks **[Who has the apple?]** (or holds up a picture of an apple, or shows the "who" gesture), then guesses by pointing to a character: **[Duck?]** Child A answers **[yes]** or **[no]** (or with the tick or cross card). Child B keeps guessing until the answer is yes, then says (or shows) **[Duck has the apple!]** Then swap roles and use the bread, then the cheese.

Model one round with a child first. Walk round and listen.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "What does **[Who?]** ask about: a thing, a place, or a person or animal?" (A person or animal: which character.)
- "In the game, how did you find out who had the apple?" (By asking and guessing, and listening for yes or no.)

✓ Closing check (with answers) (4 min)

Pairs lay their four small character cards face up. Ask with no gesture and without showing any story card. Each child points to, holds up or touches a character card:

- **[Who has bread?]**
- **[Who is happy in the rain?]**
- **[Who has an umbrella?]**

Answers: Hen; Duck; Bear.

Vocabulary

[Who?], **[Who has the ___?]**, the four character names, **[yes]**, **[no]**; review the food words.

Differentiation

- **Support:** in the game, the guesser only points to a card and looks at their partner; the partner nods or shakes their head. In the closing check, a child may look at the large story cards on the board.
- **Stretch:** in the game, the hider uses two foods at once (under two different characters) and the guesser asks about both.

⚠ Safety

- Nothing to note beyond the usual classroom rules.

Teacher notes

- **[Who?]** questions are harder than yes/no questions, because the child must find the answer rather than check it. Pointing to a character card keeps the answer easy to give.
- The game is a small information gap: only the hider knows where the food is, so the guesser really needs to ask.
- Blind children in the game: the hider tells them when the food is hidden; they feel along the tactile character cards and lift one to check after each guess.

Lesson 4: Telling it back

Unit overview - Previous: Lesson 3: Who? - Next: Lesson 5: Our picnic show

Goal: Children spot mistakes when the teacher retells the story, put the story cards in order, and retell the story in pairs with a word, sign or action for each card.

Length: about 25 minutes.

Materials

- The word card, with the story.
- The six large story cards, and sticky putty or a ledge to stand them on the board.
- The four large character cards.
- One small story card set (six cards, numbered 1 to 6 on the back) per pair.
- A tick card and a cross card for each child.
- Ear defenders and a quiet spot.
- Optional: the tactile story cards for blind or low-vision children.

Steps

✎ Opening (3 min)

Greeting chant and the morning routine. Quick **[Who?]** round: hold up a story card and ask one **[Who?]** question from lesson 3.

✎ Main activity 1: silly teacher (7 min)

Say in the school language: "I'm going to tell the story again, but I might make some mistakes. If I say something wrong, hold up your cross card. If it's right, hold up your tick card."

Hold up each story card and say one sentence (blind or low-vision children are handed the matching tactile story card). After a cross, ask children to fix it by pointing to the right character card, holding up a picture, doing an action, or saying the right word. Then say the right sentence together.

Sentences, with answers:

1. Card 1: **[It's rainy.]** (wrong: it's sunny)
2. Card 2: **[Duck has bread.]** (wrong: Duck has an apple)
3. Card 3: **[Mouse comes. Mouse has bread.]** (wrong: Hen comes, Hen has bread)
4. Card 4: **[Mouse has cheese.]** (right)
5. Card 5: **[Duck is sad.]** (wrong: Duck is happy)
6. Card 6: **[Bear has an apple!]** (wrong: Bear has an umbrella)

✎ Main activity 2: put it in order and tell it (8 min)

Each pair shuffles their six small story cards and lays them face up. Together they put them in story order. When they think they are done, they turn the cards over: the numbers on the back should go 1 to 6. If not, they swap cards and try again.

Then they take turns to retell: child A points to a card, and child B says, signs or shows one word or action for it (for example **[sunny]**, **[basket]**, **[Duck]**, **[apple]**, **[Oh no!]**, **[umbrella]**, the happy action). Then swap. A child who wants to can say a whole sentence.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "How did you know which card came first?" (The sun and the basket: the picnic starts. The friends come one by one. The rain comes before the umbrella.)
- "Which card is the 'Oh no!' part of the story?" (Card 5, when it starts to rain.)

✓ Closing check (with answers) (4 min)

Stand four large story cards on the board in a shuffled row: card 5, card 1, card 4, card 2 (numbers face to the wall). Ask, in the school language, "Which card comes first in the story? Then which?" Children point or call out the position (first, second ...), and a helper moves the cards into the order the class agrees. Blind or low-vision children have tactile story cards 5, 1, 4 and 2 in the same shuffled row at their desk, and order them by touch. Then point to card 5 and say, in the school language, "Tell me or show me in our new language what happens here"; children give one word, sign or action.

Answers: card 1 (Bear with the basket in the sun), card 2 (Duck with the apple), card 4 (Mouse with the cheese), card 5 (rain). For card 5, any fitting word or action counts: **[rainy]**, **[sad]**, **[Oh no!]**, or the rain action.

Vocabulary

The story sentences; review **[yes]**, **[no]**, the character names, the food and weather words.

Differentiation

- **Support:** a pair orders only cards 1, 2, 5 and 6 first, then adds 3 and 4; or the child retells by doing an action for each card.
- **Stretch:** a child retells a card with a whole sentence, or makes their own "silly" mistake for the class to spot.

⚠ Safety

- Nothing to note beyond the usual classroom rules.

Teacher notes

- Retelling with mistakes for children to correct is one of the ways a story can be told back (see the TPR Storytelling source). Include a sentence that is right, so children must listen rather than always say "no".

Lesson 5: Our picnic show

Unit overview - Previous: Lesson 4: Telling it back

Goal: Children act "Bear's Picnic" in small groups while the teacher tells it, and each child does a short one-to-one check during the week.

Length: about 30 minutes, plus about 3 minutes per child for the check, spread over the week.

Materials

- The word card, with the story.
- **Show things:** the large character cards or puppets (Bear, Duck, Hen, Mouse), the picnic props (basket, play-food or card apple, bread and cheese, large paper umbrella) and the six large story cards.
- Paper and crayons for each child (closing activity).
- **Check things:** one set of four small character cards; story cards 1, 2, 5 and 6 from a small set; story cards 2, 3 and 5 (large or small); one tick and one cross card; the record sheet (class list with five columns).
- Ear defenders and a quiet spot.
- Optional: the tactile character cards and tactile story cards for blind or low-vision children (in the show and in the check).

Steps

✎ Opening (3 min)

Greeting chant and the morning routine. Tell "Bear's Picnic" once with the story cards; everyone does the actions.

✎ Main activity 1: getting ready (5 min)

Make groups of four. In each group, children choose a part: Bear, Duck, Hen or Mouse. A child who does not want to act can be the **card holder** instead (holding up each story card at the right time), and a group may have two Bears or no Hen; the story still works.

Groups practise once in their places, quietly, while you tell the story: each character holds up their card or puppet when named, does the "has" action with their prop, and does happy or sad at the right time.

✎ Main activity 2: the show (12 min)

Each group comes to the front in turn. Tell the story slowly; the group acts it with the props, and the rest of the class does the weather and feeling actions from their seats. Children who want to can say their own line (**[Thank you, Duck!]**, **[Oh no!]**). At the end, the class does the "The end" action and claps or waves hands (silent applause).

Groups who prefer can act from their seats, or show only their cards.

Closing (10 min)

Children draw their favourite card from the story on their paper. While they draw, start the one-to-one check (below) with the first few children, in a quiet corner.

One-to-one check (about 3 minutes each child)

Do this away from the class, during this lesson and on other days this week. Use no gesture, no pointing and no character action when asking, unless a child's access plan says otherwise. Record each part as **yes**, **with help** or **not yet**.

1. **Names.** Lay the four small character cards in a shuffled row. Say each name in a new order: **[hen]**, **[bear]**, **[mouse]**, **[duck]**. The child points to, touches or picks up the card. Answer: the matching card each time.
2. **Yes or no.** Show one story card at a time and ask. The child answers with the tick or cross card, a nod or headshake, or **[yes]** / **[no]**.
    - Card 2: **[Does Duck have an apple?]** Answer: yes.
    - Card 3: **[Does Hen have cheese?]** Answer: no (Hen has bread).
    - Card 5: **[Is it sunny?]** Answer: no (it's rainy).
3. **Who?** Leave the four character cards in a row; show no story card. Ask:
    - **[Who has the cheese?]** Answer: Mouse.
    - **[Who is happy in the rain?]** Answer: Duck.
    - **[Who has the basket?]** Answer: Bear.
4. **Order.** Shuffle story cards 1, 2, 5 and 6 and lay them face up. Say, in the school language, "Put them in story order." Answer: 1 (Bear, basket, sun), 2 (Duck, apple), 5 (rain), 6 (umbrella).
5. **Retell.** With the four cards in order (put them in order for the child if part 4 was not yet), point to each card and say, in the school language, "Tell me or show me in our new language." The child gives one word, sign or action for each card. Answer: anything that fits, for example card 1 **[sunny]** or **[basket]** or **[Bear]**; card 2 **[Duck]** or **[apple]**; card 5 **[rainy]**, **[sad]**, **[Oh no!]** or the rain action; card 6 **[umbrella]**, **[happy]** or the happy action.

Doing it in their own way (pointing, signs, actions, the child's usual access) counts as **yes**. Blind or low-vision children use the tactile character and story cards for every part; in part 4 they order the tactile cards by touch.

Vocabulary

All the story words and sentences; **[Who?]**; yes/no questions; **[The end]**.

Differentiation

- **Support:** in the show, a child only holds up their character card when named. In the check, part 4 can use only cards 1 and 6 first ("which comes first?") and then the other two.
- **Stretch:** in the show, a child says a whole line; in the check, the child retells with a sentence for each card.

⚠ Safety

- Play food is too big to fit in a mouth and is never tasted.
- Keep a clear space at the front for each group; props are passed, not thrown.

Teacher notes

- The check uses only the questions and phrases practised in lessons 2 to 4.
- "Not yet" is normal. The story can be told again later in the year, and new stories can use the same kinds of questions.
- Drawings are for enjoyment; they are not marked.

Grade 2 Second Language: Things in the Classroom (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 10 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Children are never asked what they own or have at home: every "have" question is about a game card or a made-up character's bag.
>
> Text-checked by one other agent (Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 1. Builds on grade 1: Food Words and "I Like / I Don't Like", Weather, Clothes and Days of the Week and A Picture Story with Yes/No and "Who?" Questions.

It goes back to words from kindergarten (Hello, My Name Is, and Classroom Words and Numbers to Ten, Colours and Animals Through Games) and extends them: six more classroom objects, four more colours, numbers from eleven to twenty, and the pair **[I have ___]** / **[Do you have ___?]**. In grade 1 term 3 children heard **[___ has ___]** in a story; now they use "have" about cards in their own hands.

Which language?

This unit works with any language the school teaches. Before lesson 1, fill in the **word card** below. In the lessons, words in square brackets, like **[a red crayon]**, mean "say this in the language you are teaching".

English meaning	Your language	Gesture or picture to go with it
(review from kindergarten) book, chair, table, door, window, pencil		point to the real object
crayon, ruler, eraser, glue stick, bag, paper		hold up the real object or its picture card
(review from kindergarten) red, blue, yellow, green, black, white		point to the colour card
orange, pink, purple, brown		point to the colour card
(review) one to ten		fingers or dot cards, as in kindergarten
eleven to twenty		the number card; ten fingers, then the extra fingers
How many?		palms up, then wiggle all ten fingers
I have ___		one hand flat on the chest, then show the card
Do you have ___?		point an open hand towards the other person, eyebrows up
Does ___ have ___?		the same open-hand gesture, towards the bag card
yes, no, thank you		as in grade 1 (or the tick and cross cards)

Grammar warning: languages differ a lot here. Colour words may come before or after the object, and may change with it ("a red crayon", "a crayon red", or a different ending). Numbers

may change the object word ("twelve crayons"), or the language may need a counting word between the number and the object. "Have" may be a verb, a phrase such as "with me is", or a word that changes with the thing. Say every phrase the way the language really says it. Children only need to **understand** the phrases and **show** their answers; saying them is invited, never required.

Gesture warning: as in grade 1, if thumbs up or thumbs down is rude where you live, use the tick and cross cards (or the school's usual signs) everywhere this unit says "yes or no".

Little Hill school bags

The made-up characters of Little Hill (who appear in other units of these drafts) are getting ready for school. These four **bag cards** are used in lessons 4 and 5 and in the check. Draw each bag open, with its things clearly drawn and the crayons in a neat row so they can be counted (an example, not from a source; CC0, free to change):

Bag card	What is in the bag
Duck's bag	a book, a ruler and **12 yellow crayons**
Hen's bag	a glue stick, an eraser and **15 red crayons**
Mouse's bag	a pencil, paper and **18 green crayons**
Goat's bag	a book, an eraser and **20 orange crayons**

Big idea

We can **name the things around us**, say **what colour** they are and **how many** there are, and **ask someone whether they have something**, using a few practised words, numbers and questions.

Outcomes

By the end of the unit, most children can:

1. Point to, hold up or name twelve classroom objects (six from kindergarten and six new ones) when the teacher names them.
2. Point to or name ten colours (six from kindergarten and four new ones), and pick out an object by its colour (for example **[the blue crayon]**).
3. Count along from **[one]** to **[twenty]**, point to the number card for a number from eleven to twenty, and count out that many cubes.
4. Answer **[Do you have ___?]** about cards they are holding with **[yes]** or **[no]**, and ask it (by saying, signing or showing) in a pair game.
5. Answer simple questions about a picture: what is in a character's bag, and **[How many?]** for a number up to twenty.

Prior knowledge

- Hello, My Name Is, and Classroom Words (kindergarten): **[book]**, **[chair]**, **[table]**, **[door]**, **[window]**, **[pencil]**.
- Numbers to Ten, Colours and Animals Through Games (kindergarten): **[one]** to **[ten]**; **[red]**, **[blue]**, **[yellow]**, **[green]**, **[black]**, **[white]**.

- Food Words and "I Like / I Don't Like" (grade 1): **[yes]**, **[no]**, **[thank you]**, the tick and cross cards.
- A Picture Story with Yes/No and "Who?" Questions (grade 1): **[___ has ___]**, and the characters Duck, Hen and Mouse.
- In mathematics, grade 2 children usually count to twenty and beyond in the school language, so the numbers are new **words**, not new ideas.
- Children who missed earlier units can still take part; every word has a card, an object or an action.

Lessons

Keep the 1-minute greeting chant at the start of each day.

Lesson	Title	Time	Core idea
1	What is it?	30 min	Twelve classroom objects: six old, six new; the mystery bag
2	A red crayon, a blue ruler	30 min	Ten colours; picking out an object by its colour
3	Counting to twenty	30 min	Eleven to twenty; **[How many?]** with cubes and number cards
4	Do you have a red crayon?	30 min	**[I have ___]** and **[Do you have ___?]** with bag cards and a pair card game
5	Packing Mouse's bag	30 min	A listening task with bag mats; one-to-one check

Timings: lessons 1-4 are 30 minutes (3 + 7 + 12 + 3 + 5); lesson 5 is 30 minutes (3 + 5 + 14 + 3 + 5, with the check spread over the week).

Materials

- The filled-in word card (above), kept where the teacher can see it.
- **Twelve large object picture cards:** book, chair, table, door, window, pencil, crayon, ruler, eraser, glue stick, bag, paper. Drawn by the teacher is fine; draw the objects in black outline so they are not told apart by colour.
- **An object basket** with the real things: a crayon, a ruler, an eraser (large, at least the size of a matchbox), a glue stick with its lid on, a cloth bag and a sheet of paper. A book and a pencil from the classroom go in too.
- **Ten large colour cards:** a big patch of each colour (red, blue, yellow, green, black, white, orange, pink, purple, brown). Make the colours strong and clearly different.
- **Ten crayons**, one of each of the ten colours, kept with the colour cards (lesson 2).
- **Large number cards 1 to 20**, one number each, big enough to read from the back of the room, with the number shown as dots on the back (ten dots in two rows of five, plus the extra dots below).
- **A counting tub per pair:** 20 linking cubes (or other counters too big to swallow).
- **Small number cards 11 to 20:** one set of ten per pair (lessons 3 and 5).
- **The four Little Hill bag cards** (see above), large enough to see from the back of the room.
- **Pair card sets** for the "Do you have?" game: per pair, twelve small cards, two each of **red crayon**, **blue crayon**, **yellow crayon**, **book**, **ruler** and **eraser** (lessons 4 and 5). Each crayon card shows a crayon in a strong patch of its colour, and also has the colour word

written small in the school language on the card, so children who confuse colours can still play.
- **Bag mats:** one per child, an A4 sheet with a large empty bag outline and a box at the bottom labelled "How many crayons?" (lesson 5).
- A pencil for each child and a box of crayons per table (lesson 5).
- **Tick and cross cards:** one of each per child, as in grade 1.
- **Check things** (lesson 5): the six object picture cards crayon, ruler, eraser, glue stick, book and pencil; the ten colour cards; the small number cards 11 to 20; 20 linking cubes; one red crayon card, one book card and one ruler card from a pair set; Hen's bag card; and the record sheet (class list with five columns).
- Ear defenders and a quiet spot, as in every unit.
- Optional, for blind or low-vision children: **tactile number cards 11 to 20** (raised dots in the same pattern as the large cards, plus the braille or raised numeral if the child reads it) and **tactile bag cards** (the real objects, or felt shapes, glued in a shallow tray, with the crayons as a row of raised sticks that can be counted).
- Optional, for blind children: a **tactile pair card set** (the real objects, or felt shapes on card; crayon colours told apart by raised dots: one dot red, two dots blue, three dots yellow) for lesson 4, and a **real-object tray** (ruler, glue stick, paper, book, eraser and a row of crayons) for lesson 5.
- Optional: a fluent speaker's recording of the word card.

Access and inclusion

- **Speaking is optional.** Pointing, holding up cards, signs and actions all count. Never make a child speak alone in front of others.
- **"Have" is about game cards only.** Never ask children what is in their own bag or pencil case, what they have at home, or what they have brought. Children do not bring things from home for this unit; everything is supplied. If a child talks about their own things, listen kindly and move on.
- **Colour vision:** some children cannot tell some colours apart (most often red from green, and sometimes purple from blue or brown from green). If a child mixes up only those colours, do not record it as a language gap; note it privately and tell the class teacher. Never make a game of it. The pair cards carry a small written colour word for this reason.
- **Blind children:** colour words are learned as words in the chants, and the colour part of the check (part 2) is recorded as "not applicable". Objects, numbers and "have" use the real objects, the tactile number cards and the tactile bag cards. Say each word as you hand the object over.
- **Low-vision children:** large, high-contrast cards; let them hold the real objects; seat them near the board.
- **Deaf or hard-of-hearing children:** keep your face visible; hold up the object or card every time you say its word.
- **If the language is a sign language:** the signs are the words. Number signs may not match finger counting; teach the language's own number signs. In checks, if a sign looks like its answer (for example a number sign shaped like a finger count), ask the child to point to the number card or count out cubes instead, so the sign does not show the answer.
- **Movement and fine motor:** children who find small cards or cubes hard use the large cards, point while a partner moves the cubes, or count by touching a row of cubes that is already joined.
- **Children new to the school language:** keep gestures identical every time and accept answers in any language.
- **Noise:** quiet spot and ear defenders allowed.

Assessment

Lesson 5 includes a five-part check, done one-to-one (about 3 minutes each child; spread over the week). Ask everything with no gesture and without pointing. Record each part as **yes**, **with help** or **not yet**:

1. **Objects:** lay out the six object picture cards (crayon, ruler, eraser, glue stick, book, pencil) shuffled in a row. Ask the child to point to **[ruler]**, **[eraser]**, **[glue stick]** and **[crayon]**. Yes = four of four.
2. **Colours:** lay out the ten colour cards shuffled. Ask for **[orange]**, **[purple]**, **[blue]** and **[brown]**. Yes = three of four. (Not applicable for blind children; see Access.)
3. **Numbers:** lay out the small number cards 11 to 20 shuffled. Ask the child to point to **[thirteen]**, **[seventeen]** and **[twenty]**; then give the 20 cubes and ask for **[twelve]**. Yes = all four (the cubes may be counted in any way).
4. **Do you have?:** give the child the red crayon card, the book card and the ruler card to hold so you cannot see them. Ask **[Do you have a ruler?]** (yes), **[Do you have an eraser?]** (no), **[Do you have a red crayon?]** (yes). Yes = three of three, by saying, signing, nodding or the tick and cross cards.
5. **Bag card:** show Hen's bag card. Ask **[How many crayons?]** (fifteen: the child says or signs it, or points to the number card 15) and **[Does Hen have an eraser?]** (yes). Yes = both.

Doing it in their own way (pointing, signs, the child's usual access) counts as **yes**. "Not yet" is normal for some children; the games can be played again any time. Saying **[I have ___]** aloud is a stretch and is **not** recorded.

Sources

- NCSSFL-ACTFL Can-Do Statements, Novice: https://www.actfl.org/uploads/files/general/Resources-Publications/Can-Do-Novice.pdf (read 10 November 2026; the quoted lines were checked against the rendered PDF pages). These are performance indicators and examples, not a curriculum. Lines used for this unit:
  - Presentational, Novice Low (PDF page 23): function "I can name", context "very familiar people, places, and objects with the help of gestures, facial expressions, or visuals"; examples "I can name items I see every day." and "I can say numbers from 1-10." (outcomes 1 to 3; this unit goes on to twenty).
  - Interpersonal, Novice Low (PDF page 19): "I can provide information by answering a few simple questions", context "on very familiar topics, with the help of gestures, facial expressions, and visuals", text type "using practiced or memorized words and phrases"; example "I can respond to a basic math question using numbers." (outcomes 4 and 5).
  - Interpersonal, Novice Mid (PDF page 19): "I can request and provide information by asking and answering simple questions" (asking **[Do you have ___?]** in the pair game, a stretch for some children).
  - Presentational, Novice Mid example (PDF page 23): "I can give some simple information about my classroom or school." (the unit topic).
- Wikipedia, "Information gap task": https://en.wikipedia.org/wiki/Information_gap_task (read 9 November 2026). Learners are missing information and must communicate to fill the gap. The pair card game in lesson 4 is an information gap: each child cannot see the partner's cards, so they need to ask.

- Wikipedia, "Total physical response": https://en.wikipedia.org/wiki/Total_physical_response . As in earlier units: commands answered with actions, listening before speaking, low stress.

Known gaps

- One other agent (Gemini 4 Argon, at 6b9fa92) text-checked this unit on 2026-11-10 and reported no errors. That is a text check by an AI agent, not a teacher review or classroom test.
- **No pronunciation help**, as in earlier units. Use a fluent speaker's recording if needed.
- **Grammar differs:** this unit cannot say how colours, numbers with objects, or "have" work in your language (see the grammar warning). Check with a fluent speaker.
- **Word choices are the author's.** The Can-Do Statements describe what learners can do; they do not list words for a grade 2 class. The six new objects and four new colours were chosen because they are common in classrooms and easy to show; swap them for local ones if needed.
- **Numbers above twenty** and number patterns (twenty-one, thirty...) are left for later; in some languages the teens are irregular and the twenties are easier, in others the reverse.
- The pair card game uses only three colours and three objects, to keep it short; a fuller game is a possible extension.

The lesson order matters: children meet the objects (lesson 1) before describing them by colour (lesson 2), learn the numbers (lesson 3) before counting a character's crayons, and use **[Do you have ___?]** with cards (lesson 4) before the listening task and the check (lesson 5).

Lesson 1: What is it?

Unit overview - Next: Lesson 2: A red crayon, a blue ruler

Goal: Children point to, hold up or name twelve classroom objects: six from kindergarten (book, chair, table, door, window, pencil) and six new ones (crayon, ruler, eraser, glue stick, bag, paper).

Length: about 30 minutes.

Materials

- The word card.
- The twelve large object picture cards.
- The object basket (a crayon, a ruler, an eraser, a glue stick with its lid on, a cloth bag, a sheet of paper, a book and a pencil).
- Ear defenders and a quiet spot.
- Optional: for blind or low-vision children, let them hold each real object from the basket as it is named.

Steps

✎ Opening (3 min)

Greeting chant. Then, in the school language: "In kindergarten we learned some classroom words in our new language. Let's see what we remember, and learn some more."

Warm-up: touch the chair! (7 min)

Play the kindergarten game. Say **[Touch the chair!]**, **[Touch the door!]**, **[Touch the window!]**, **[Touch the table!]**, then the book and the pencil from the basket (held up at the front). Children point to or touch the object (from their seat is fine). Go faster as they remember. Then hold up each of the six old picture cards and invite the class to say or sign the word together.

✎ Main activity: six new things and the mystery bag (12 min)

1. **Meet the new words (5 min).** Take the crayon, ruler, eraser, glue stick and paper out of the basket one at a time, then hold up the cloth bag. For each: say the word three times, put its picture card on the board, and invite the class to say or sign it after you. Then point to the cards in a new order and let the class say or sign each one.
2. **Mystery bag (7 min).** Put the seven small objects (crayon, ruler, eraser, glue stick, paper, book, pencil) into the cloth bag while children close their eyes. Ask a volunteer to put a hand in the bag and feel one object without looking. The class asks **[What is it?]** (teacher models it first). The volunteer names it, signs it, or points to the picture card on the board; then pulls it out to see. The class says the word together. Take turns until every object has come out. Nobody has to have a turn; a child who would rather not can choose a card from the board instead.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "In the mystery bag, how did you know what it was without looking?" (By its shape, size and how it felt: the ruler is long and flat, the eraser is soft, the glue stick has a lid.)
- "Which new word was easiest to remember? Why?" (Any answer; for example a word that sounds like the school-language word, or one with a good picture.)

✓ Closing check (with answers) (5 min)

Put the twelve picture cards on the board in a new order. Say each word with no gesture and without looking at the card. Children point to the right card (from their seat), or name it:

- **[ruler]**
- **[eraser]**
- **[glue stick]**
- **[window]**

Answers: the ruler card; the eraser card; the glue stick card; the window card (or the real window).

Vocabulary

[crayon], **[ruler]**, **[eraser]**, **[glue stick]**, **[bag]**, **[paper]**, **[What is it?]**; review **[book]**, **[chair]**, **[table]**, **[door]**, **[window]**, **[pencil]**, **[Touch ___!]**.

Differentiation

- **Support:** in the mystery bag, the volunteer may peek, or choose between two picture cards that the teacher holds up.
- **Stretch:** the volunteer describes the object before pulling it out, in the new language if they can (for example **[It is a ruler]**), or gives the school-language clue "long and flat".

⚠ Safety

- The glue stick keeps its lid on. Nothing sharp goes in the mystery bag (no scissors, no pencil sharpener); use a blunt pencil, or leave the pencil out.
- Objects are too big to swallow.

Teacher notes

- Six new words is a lot for one lesson; the other lessons repeat all twelve, so children do not need to know them all today.
- The mystery bag is fun because nobody (not even the class) knows what will come out. Keep it light; guessing wrong is part of the game.

- Blind children can take a full turn in the mystery bag: it is a touch game. Say the word as they hold up the object.

Lesson 2: A red crayon, a blue ruler

Unit overview - Previous: Lesson 1: What is it? - Next: Lesson 3: Counting to twenty

Goal: Children point to or name ten colours (six from kindergarten and four new: orange, pink, purple, brown), and pick out an object by its colour.

Length: about 30 minutes.

Materials

- The word card.
- The ten large colour cards.
- The ten crayons, one of each colour.
- The twelve large object picture cards.
- The object basket.
- Ear defenders and a quiet spot.

Steps

✎ Opening (3 min)

Greeting chant. Hold up five object picture cards one at a time; the class says or signs each word.

Warm-up: colours we know (7 min)

Put the six kindergarten colour cards (red, blue, yellow, green, black, white) on the board. Say a colour; children point to the card. Then play **[Touch something ___!]** as in kindergarten: **[Touch something blue!]** Children point to or touch something of that colour in the room (from their seat is fine; pointing counts). Use only colours that are easy to find in your classroom.

✎ Main activity: four new colours and the crayon line (12 min)

1. **New colours (4 min).** Add the orange, pink, purple and brown cards to the board, one at a time: say each word three times and invite the class to say or sign it. Then point to all ten cards in a new order; the class says or signs each colour.
2. **The crayon line (8 min).** Lay the ten crayons in a line along the board ledge (or on a table at the front). Say the colour and the object together, the way your language says it: **[the orange crayon]**, **[the purple crayon]**. A volunteer comes and picks up that crayon and holds it up; the class says the phrase together. After a few turns, mix in other objects of clear colours from the basket or room (for example **[the blue book]** if you have one). Then swap: the volunteer picks up any crayon and the class names its colour.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "When I said 'the orange crayon', which word told you which crayon to take?" (The colour word; all of them were crayons.)
- "In our new language, does the colour word come before or after the thing, or does it change?" (Depends on the language; the teacher answers from the word card.)

✓ Closing check (with answers) (5 min)

Keep the ten colour cards on the board, in a new order. Say each colour with no gesture. Children point to the right card from their seat, or name it:

- **[purple]**
- **[orange]**
- **[brown]**
- **[pink]**

Answers: the purple, orange, brown and pink cards.

Vocabulary

[orange], **[pink]**, **[purple]**, **[brown]**, **[the ___ crayon]**; review **[red]**, **[blue]**, **[yellow]**, **[green]**, **[black]**, **[white]**, **[Touch something ___!]**, the twelve objects.

Differentiation

- **Support:** in the crayon line, the teacher points to two crayons and asks the volunteer to choose one of them.
- **Stretch:** the volunteer says a colour and an object for someone else to pick up (for example **[the green crayon]**).

⚠ Safety

- Nothing to note beyond the usual classroom rules. Children stay in their seats or walk to the front one at a time.

Teacher notes

- **Colour vision:** see Access in the unit overview. If a child mixes up only red and green (or purple and blue, or brown and green), note it privately, do not correct them in front of others, and tell the class teacher.
- Blind children learn the colour words in the chant; in the crayon line, they can choose a crayon by position ("the third crayon") while the class says its colour.

- This lesson uses a colour and an object together, which is where the grammar of many languages changes. Say it the real way every time; children will copy the pattern without needing a rule.

Lesson 3: Counting to twenty

Unit overview - Previous: Lesson 2: A red crayon, a blue ruler - Next: Lesson 4: Do you have a red crayon?

Goal: Children count along from **[one]** to **[twenty]**, point to the number card for a number from eleven to twenty, and count out that many cubes when asked **[How many?]**.

Length: about 30 minutes.

Materials

- The word card.
- The large number cards 1 to 20.
- A counting tub per pair (20 linking cubes).
- The small number cards 11 to 20, one set of ten per pair.
- Ear defenders and a quiet spot.
- Optional: the tactile number cards 11 to 20 for blind or low-vision children.

Steps

✎ Opening (3 min)

Greeting chant. Count from **[one]** to **[ten]** together on fingers, as in kindergarten, twice: once slowly, once fast.

Warm-up: one to ten (7 min)

Put the large number cards 1 to 10 in a row on the board. Say a number with no gesture; children show it on their fingers or point to the card. Then turn a few cards round to show the dots and ask **[How many?]**; children say, sign or show the number.

✎ Main activity: eleven to twenty (12 min)

1. **New numbers (5 min).** Put the cards 11 to 20 on the board after the first ten. Say each new number while showing it: ten fingers, then the extra fingers (for **[thirteen]**: ten fingers, then three). Invite the class to say or sign each number after you. Then count from **[one]** to **[twenty]** together, pointing along the row, twice.
2. **Show me with cubes (7 min).** Each pair has a counting tub and a set of small number cards 11 to 20, spread face up. Say a number from eleven to twenty with no gesture. Each pair points to the number card, then builds a tower with that many cubes: one child joins cubes while the other counts in the new language (or both count together). Hold up the large card so pairs can check. Swap jobs each round. Use about six numbers, for example **[fourteen]**, **[eleven]**, **[nineteen]**, **[sixteen]**, **[twelve]**, **[twenty]**.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "How did you check your tower had the right number of cubes?" (Counted again; put it next to another tower; made a ten and counted on.)
- "Do the numbers from eleven to twenty in our new language sound like 'ten and one, ten and two'? Or are they different words?" (Depends on the language; the teacher answers from the word card. In many languages the teen numbers are built from ten.)

✓ Closing check (with answers) (5 min)

Each pair keeps its small number cards 11 to 20 face up, shuffled. Say each number with no gesture. Each child points to the card (partners take turns to point first):

- **[fifteen]**
- **[eighteen]**
- **[eleven]**
- **[twenty]**

Answers: cards 15, 18, 11, 20.

Vocabulary

[eleven] to **[twenty]**, **[How many?]**; review **[one]** to **[ten]**.

Differentiation

- **Support:** a pair builds a tower of ten first, then adds the extra cubes; the teacher points to the large card as well as saying the number.
- **Stretch:** a child says a number for their partner to build, or counts backwards from **[twenty]** to **[ten]**.

⚠ Safety

- Cubes are too big to swallow and stay on the table. Nothing to note beyond the usual classroom rules.

Teacher notes

- Children usually know these numbers in the school language already (see Prior knowledge), so the new learning is the words. Keep the counting easy and the words frequent.
- **Number signs:** if the language is a sign language, teach its own number signs; some do not match finger counting.

- Blind children use the tactile number cards and build towers by touch; the partner can say the number again as they finish.

Lesson 4: Do you have a red crayon?

Unit overview - Previous: Lesson 3: Counting to twenty - Next: Lesson 5: Packing Mouse's bag

Goal: Children understand **[I have ___]** and answer **[Do you have ___?]** with **[yes]** or **[no]**, and ask it (by saying, signing or showing) in a pair card game.

Length: about 30 minutes.

Materials

- The word card.
- The four Little Hill bag cards (Duck, Hen, Mouse, Goat).
- The large number cards 11 to 20.
- One pair card set per pair (twelve small cards: two each of red crayon, blue crayon, yellow crayon, book, ruler, eraser).
- A tick card and a cross card for each child.
- Ear defenders and a quiet spot.
- Optional: the tactile bag cards for blind or low-vision children; a tactile pair card set (the real objects, or felt shapes on card, with the crayon colours told apart by a raised dot pattern: one dot red, two dots blue, three dots yellow).

Steps

✎ Opening (3 min)

Greeting chant. Count from **[one]** to **[twenty]** together, pointing along the large number cards 11 to 20 for the second half.

Warm-up: what's in Duck's bag? (7 min)

Hold up Duck's bag card. Speak as Duck (a duck voice or the duck action from earlier units), with the **[I have ___]** gesture (hand on chest): **[I have a book. I have a ruler. I have yellow crayons.]** Ask the class **[How many crayons?]** Count the crayons together on the card: **[twelve]**. Then ask the class yes/no questions; children answer with the tick or cross card, or say or sign **[yes]** or **[no]**:

1. **[Does Duck have a ruler?]** (yes)
2. **[Does Duck have a glue stick?]** (no)
3. **[Does Duck have a book?]** (yes)

Do the same with Hen's bag card: **[I have a glue stick. I have an eraser. I have red crayons.]** Count: **[fifteen]**.

✎ Main activity: the "Do you have?" card game (12 min)

1. **Model it (3 min).** Play one round at the front with a volunteer, using a pair card set. Teacher asks with the gesture (open hand towards the volunteer, eyebrows up): **[Do**

you have a ruler?] The volunteer looks at their cards and says, signs or shows **[yes]** or **[no]**. If yes, they give the card and may say **[Yes, I have a ruler]** (a stretch, never required); the teacher says **[Thank you!]** and puts the two rulers down as a pair.

2. **Play in pairs (9 min).** Shuffle the twelve cards and deal six each. Children hold their cards so the partner cannot see them (or keep them face down on the table and peek). Any pairs a child already holds go face up on the table. Children take turns: ask for a card **you already hold one of**: **[Do you have a ___?]** If the partner has it, they hand it over (**[yes]**); the asker says **[Thank you!]** and puts the pair down. If not, the partner says or shows **[no]**, and it is the partner's turn. The game ends when all six pairs are down. Play again if there is time. Walk round and listen; help with words, not with the cards.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Why did you need to ask your partner?" (Because I couldn't see their cards: only they knew what they had.)
- "Which card did you ask for most? How did you say it?" (Any answer; let a few children say or show their question.)

✓ Closing check (with answers) (5 min)

Hold up Mouse's bag card. Ask with no gesture. Children answer with the tick or cross card, or say or sign the answer:

- **[Does Mouse have a pencil?]**
- **[Does Mouse have a ruler?]**
- **[Does Mouse have paper?]**

Then ask **[How many crayons?]**; children count the crayons on the card (the teacher points along them without saying the numbers) and say, sign or hold up the right number of fingers in two goes (ten, then eight), or point to the large number card.

Answers: yes; no; yes; eighteen.

Vocabulary

[I have ___], **[Do you have ___?]**, **[Does ___ have ___?]**; review **[yes]**, **[no]**, **[thank you]**, **[How many?]**, the objects, colours and numbers.

Differentiation

- **Support:** play with only six cards (three pairs: red crayon, book, ruler); the asker may hold up their own card instead of naming it.
- **Stretch:** answer in a full sentence, **[Yes, I have a red crayon]** or **[No, I don't have a red crayon]** (the teacher models the "no" sentence the way the language says it).

⚠ Safety

- Nothing to note beyond the usual classroom rules.

Teacher notes

- **"Have" is about the cards only.** Never ask a child what they have in their own bag, pencil case or home. If a child starts telling you, listen kindly and go back to the game.
- The card game is a small information gap: only the partner knows what is in their hand, so asking is really needed.
- Children who confuse some colours can read the small colour word on the crayon cards, or ask for the book, ruler and eraser pairs only.
- Blind children play with the tactile pair cards; the partner says the card's name as they hand it over.

Lesson 5: Packing Mouse's bag

Unit overview - Previous: Lesson 4: Do you have a red crayon?

Goal: Children listen to a short description of what a character packs, draw the things on a bag mat and write how many crayons; the teacher does the one-to-one check over the week.

Length: about 30 minutes (the one-to-one check is spread over the week, about 3 minutes per child).

Materials

- The word card.
- The four Little Hill bag cards.
- The twelve large object picture cards and the large number cards 11 to 20.
- A bag mat for each child.
- A pencil for each child, and a box of crayons per table.
- One pair card set per pair (for children waiting for the check).
- A tick card and a cross card for each child.
- **Check things:** the six object picture cards crayon, ruler, eraser, glue stick, book and pencil; the ten colour cards; a set of small number cards 11 to 20; 20 linking cubes; one red crayon card, one book card and one ruler card from a pair set; Hen's bag card; the record sheet (class list with five columns).
- Ear defenders and a quiet spot.
- Optional: the tactile bag cards and tactile number cards for blind or low-vision children; a real-object tray and the cloth bag from the object basket (see Teacher notes).

Steps

✎ Opening (3 min)

Greeting chant. Count from **[one]** to **[twenty]** together.

Warm-up: quick quiz (5 min)

Hold up Goat's bag card. Ask: **[Does Goat have a book?]** (yes), **[Does Goat have a pencil?]** (no), **[Does Goat have orange crayons?]** (yes), **[How many crayons?]** (twenty). Children answer with the tick or cross card, by pointing to a number card on the board, or by saying or signing the answer.

✎ Main activity: packing Mouse's bag (14 min)

1. **Listen and draw (8 min).** Give out the bag mats. In the school language: "It's a new day, and Mouse is packing a new bag. Listen, and draw what Mouse puts in." Say each sentence twice, slowly, with no gesture and no pictures, as Mouse (whiskers action only at the start): **[I have a ruler.] [I have a glue stick.] [I have paper.] [I have blue crayons. Fourteen blue crayons!]** Children draw each thing in the bag outline (a quick picture is fine), colour one crayon blue, and write **14** in the "How many crayons?"

box (or show it with cubes or fingers if writing is hard). After the second reading, hold up the object picture cards one by one so everyone can check; children add anything missing.

2. **Partner check (6 min).** Pairs compare mats and use the new language to point and name: **[a ruler]**, **[a glue stick]**... Then pairs play the "Do you have?" card game from lesson 4 while the teacher starts the one-to-one checks.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "How did you remember what Mouse said?" (Listened twice; knew the words from the cards; drew as I went.)
- "What can you now say or understand in our new language that you could not at the start of the unit?" (Any answer, for example new things, new colours, numbers to twenty, asking "Do you have?")

✓ Closing check (with answers) (5 min)

Children hold up their bag mats. Say a word or ask a question in the new language, with no gesture; children point to the right drawing on their own mat, or answer with the tick or cross card:

- **[ruler]** (children point to their ruler drawing)
- **[Does Mouse have a book?]**
- **[How many crayons?]**
- **[Does Mouse have blue crayons?]**

Answers: the ruler drawing; no; fourteen; yes.

The one-to-one check

Use the five-part check in the unit overview (Assessment), over the week, while others play the card game or finish their mats. About 3 minutes per child. Record yes, with help or not yet. Saying **[I have ___]** aloud is not recorded.

Vocabulary

Review of the whole unit: the twelve objects, ten colours, **[one]** to **[twenty]**, **[How many?]**, **[I have ___]**, **[Do you have ___?]**, **[Does ___ have ___?]**.

Differentiation

- **Support:** give the child the four object picture cards (ruler, glue stick, paper, crayon) mixed with two others (book, eraser), and let them pick out the cards they hear instead of drawing.
- **Stretch:** a second round: **[Goat has a book, a pencil and sixteen purple crayons]**; or the child tells a partner what Mouse has, using **[Mouse has ___]**.

⚠ Safety

- Nothing to note beyond the usual classroom rules.

Teacher notes

- The check is one-to-one so nobody answers in front of the class; keep it calm and quick, and stop if a child is upset.
- **"Have" is about Mouse and the cards only.** Never ask what children have in their own bags.
- Blind children: use a **real-object tray** instead of drawing. Put a ruler, a glue stick, a sheet of paper, a book, an eraser and a short row of crayons in a tray; the child picks out what Mouse packs and puts it in the cloth bag, and shows **[fourteen]** with cubes or the tactile number card.

Grade 2 Second Language: Animals and Where They Live (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 11 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check it against your school's rules before use. Children are never asked about their own pets, their homes or where they live: every "where does it live?" question is about an animal card in a game.
>
> Text-checked by two other agents (Gemini 4 Carbon, Gemini 4 Argon); see Known gaps.

Back to the grade 2 year plan - Term 2. Builds on grade 2 term 1: Things in the Classroom, and on kindergarten: Numbers to Ten, Colours and Animals Through Games.

In kindergarten children learned six animal words with actions. In term 1 of grade 2 they learned ten colours and the pair **[I have ___]** / **[Do you have ___?]**. This unit adds six more animals, four places, the size words **[big]** and **[small]**, and short describing sentences: **[It lives in the ___]**, **[It is big]**, **[It is brown]** and **[It has wings]**. At the end, children put the sentences together into animal riddles.

Which language?

This unit works with any language the school teaches. Before lesson 1, fill in the **word card** below. In the lessons, words in square brackets, like **[a big brown bear]**, mean "say this in the language you are teaching".

English meaning	Your language	Gesture or picture to go with it
(review from kindergarten) cat, dog, bird, fish, frog, duck		the kindergarten actions (cat licks a paw, dog wags a tail, bird flaps, fish swims with one hand, frog hops, duck waddles)
horse, cow, sheep, pig, rabbit, bear		the actions in lesson 1, plus the picture card
house, farm, forest, pond		the place card
It lives in the ___ / Where does ___ live?		point to the animal card, then sweep the hand to the place card
big, small		hands wide apart; finger and thumb close together
(review from term 1) the ten colours		the colour cards
It is ___		point to the animal card
It has wings / a tail / four legs / two legs		flap both hands; wiggle one hand behind your back; four fingers walking on the table; two fingers walking on the table
What is it?		palms up, shoulders up
(review) yes, no		as in earlier units (or the tick and cross cards)

Grammar warning: languages differ a lot here. "In the forest" and "on the farm" may use different little words, or a word ending instead. Size and colour words may come before or after the animal and may change with it. "It" may be a different word for different animals, or may be left out. Say every phrase the way the language really says it. Children only need to **understand** the phrases and **show** their answers; saying them is invited, never required.

Gesture warning: if thumbs up or thumbs down is rude where you live, use the tick and cross cards (or the school's usual signs) everywhere this unit says "yes or no".

The Little Hill animal cards

Twelve animal picture cards are used in every lesson. In this game each animal has **one** place, one size and one main colour, so that every riddle has one answer (an example, not from a source; CC0, free to change):

Animal	Lives in (this game)	Size	Colour	It has
cat	house	small	black	four legs, a tail
dog	house	big	brown	four legs, a tail
horse	farm	big	brown	four legs, a tail
cow	farm	big	black and white	four legs, a tail
sheep	farm	small	white	four legs, a tail
pig	farm	small	pink	four legs, a tail
rabbit	forest	small	brown	four legs, a tail
bear	forest	big	brown	four legs
bird	forest	small	blue	wings, two legs, a tail
fish	pond	small	orange	a tail
frog	pond	small	green	four legs
duck	pond	small	yellow	wings, two legs, a tail

Real animals live in many places (ducks live on farms, cats in barns), and "big" and "small" are only big or small next to each other. Say this to the class in lesson 2; the table is the rule **of the game**, not a fact about the world. A bear's short tail is left out on purpose so the riddles stay clear.

Big idea

We can **name animals**, say **where they live**, and **describe them** by size, colour and body parts, using a few practised words and short sentences, and we can use those sentences to make and solve riddles.

Outcomes

By the end of the unit, most children can:

1. Point to, act out or name twelve animals (six from kindergarten and six new ones) when the teacher names them.
2. Point to the right place card (house, farm, forest, pond) when asked **[Where does the ___ live?]** about an animal card.

3. Pick out an animal picture by size and colour, for example **[the small black bear]**.
4. Show which animals match **[It has wings]**, **[It has a tail]**, **[It has four legs]** or **[It has two legs]**.
5. Solve a spoken riddle of two short sentences (for example **[It lives in the forest. It is big.]**) by pointing to the animal; some children also make a riddle with cards for a partner.

Prior knowledge

- Numbers to Ten, Colours and Animals Through Games (kindergarten): **[cat]**, **[dog]**, **[bird]**, **[fish]**, **[frog]**, **[duck]** and their actions; **[two]** and **[four]**.
- Things in the Classroom (grade 2 term 1): the ten colours (red, blue, yellow, green, black, white, orange, pink, purple, brown); **[yes]**, **[no]**; asking and answering simple questions in a pair game.
- Children who missed earlier units can still take part; every word has a card or an action.

Lessons

Keep the 1-minute greeting chant at the start of each day.

Lesson	Title	Time	Core idea
1	Six new animals	30 min	Twelve animals with actions: six old, six new
2	Where does it live?	30 min	Four places; **[It lives in the ___]** with place mats
3	A big brown bear	30 min	**[big]**, **[small]** and colours; picking out a picture by size and colour
4	It has wings	30 min	**[It has ___]**; sorting animals; first riddles
5	Little Hill animal riddles	30 min	A class poster, a pair riddle game and the one-to-one check

Timings: lessons 1-4 are 30 minutes (3 + 7 + 12 + 3 + 5); lesson 5 is 30 minutes (3 + 5 + 14 + 3 + 5, with the check spread over the week).

Materials

- The filled-in word card (above), kept where the teacher can see it.
- **Twelve large animal picture cards** (the Little Hill animal cards above), each drawn in its main colour, big enough to see from the back of the room. Draw a black outline round each animal so it can be told apart without colour.
- **Four large place cards:** house, farm, forest, pond.
- **Four place mats:** large sheets of paper, each with one place drawn on it, taped flat to the floor in four corners of the room (lesson 2).
- **Size cards per pair** (lesson 3 and the check): eight small cards: a big brown bear, a small brown bear, a big black bear, a small black bear, a big white rabbit, a small white rabbit, a big brown rabbit, a small brown rabbit. On each card the "big" animal fills the card and the "small" one is clearly smaller.
- **The ten large colour cards** from term 1 (lesson 3).
- **Four large "has" cards:** a wing, a tail, four legs, two legs (simple drawings).

- **A small card set per pair** (lessons 2, 4 and 5): the twelve animals, the four places and the four "has" cards, as small cards.
- **A riddle strip per pair** (lesson 5): a strip of card with two empty boxes, big enough for one small card each.
- **The class animal poster** (lesson 5): a large sheet with the four places drawn on it, and a blank space beside each place, plus one spare set of the twelve small animal cards to stick on it.
- **Word labels** (lesson 5): the twelve animal words written by the teacher in the language, one per strip, with tape or reusable putty.
- **Tick and cross cards:** one of each per child, as in earlier units.
- **Check things** (lesson 5): the six new animal cards (horse, cow, sheep, pig, rabbit, bear); the four place cards; the four bear size cards; the bird, fish and horse cards; the duck, frog, fish, bear, rabbit and bird cards; the record sheet (class list with five columns).
- Ear defenders and a quiet spot, as in every unit.
- Optional, for blind or low-vision children: **toy animals** for the twelve animals (too big to swallow), **tactile place cards** (a different texture for each place, introduced by touch in lesson 2), and **tactile size cards** (a big and a small felt bear shape, and a big and a small felt rabbit shape).
- Optional: a fluent speaker's recording of the word card.

⚠ Safety and access

Safety

- Place mats are taped flat so nobody trips; children walk, not run, between them.
- Toy animals and small pieces are too big to swallow; reusable putty is used by the teacher only.

Privacy

- **"Where does it live?" is about animal cards only.** Never ask children where they live, what their home is like, whether they have pets, or whether they have visited a farm. If a child talks about their own pet or home, listen kindly and go back to the game.
- Some children have lost pets, or are afraid of dogs; no child has to hold or act out an animal they do not want to.

Taking part

- **Speaking is optional.** Pointing, holding up cards, signs and actions all count. Never make a child speak alone in front of others.
- **Movement:** every action has a seated version (hands on the table). In lesson 2 a partner can carry the card to the place mat, or the child points from their seat.
- **Children new to the school language:** keep gestures identical every time and accept answers in any language.
- **Noise:** quiet spot and ear defenders allowed.

Seeing, hearing and colour

- **Colour vision:** some children cannot tell some colours apart (most often red from green, and sometimes brown from green). If a child mixes up only colours, do not record it as a language gap; note it privately and tell the class teacher. The size cards

use only brown, black and white, which are usually easier to tell apart, and every riddle in the check can be solved without colour.
- **Blind children:** colour words are learned as words in the chants, and the colour part of check item 3 is left out (ask only **[the small bear]** and **[the big bear]** with the tactile size cards). Animals, places and "has" use the toy animals and tactile place cards. Say each word as you hand the toy over.
- **Low-vision children:** large, high-contrast cards with black outlines; seat them near the board.
- **Deaf or hard-of-hearing children:** keep your face visible; hold up the card every time you say its word.
- **If the language is a sign language:** the signs are the words. Many animal signs copy the animal's shape or movement. In checks, if a sign looks like its answer, ask the child to point to the card instead, so the sign does not show the answer.

Assessment

Lesson 5 includes a five-part check, done one-to-one (about 3 minutes each child; spread over the week). Ask everything with no gesture and without pointing. Record each part as **yes**, **with help** or **not yet**:

1. **Animals:** lay out the six new animal cards (horse, cow, sheep, pig, rabbit, bear) shuffled in a row. Ask the child to point to **[horse]**, **[rabbit]**, **[bear]** and **[pig]**. Yes = four of four.
2. **Places:** lay out the four place cards. Ask **[Where does the fish live?]** (pond), **[Where does the cow live?]** (farm) and **[Where does the bear live?]** (forest). Yes = three of three.
3. **Size and colour:** lay out the four bear size cards shuffled. Ask for **[the small brown bear]** and **[the big black bear]**. Yes = both. (Blind children: see Safety and access.)
4. **It has:** lay out the bird, fish and horse cards. Say **[It has wings. What is it?]** (bird) and **[It has four legs. What is it?]** (horse). Yes = both.
5. **Riddles:** lay out the duck, frog, fish, bear, rabbit and bird cards. Say **[It lives in the forest. It is big. What is it?]** (bear) and **[It lives in the pond. It has four legs. What is it?]** (frog). Yes = both.

Doing it in their own way (pointing, signs, the child's usual access) counts as **yes**. "Not yet" is normal for some children; the games can be played again any time. Saying a riddle aloud is a stretch and is **not** recorded.

Sources

- NCSSFL-ACTFL Can-Do Statements, Novice: https://www.actfl.org/uploads/files/general/Resources-Publications/Can-Do-Novice.pdf (read 10 November 2026; the quoted lines were checked against the rendered PDF pages). These are performance indicators and examples, not a curriculum, and the unit is not a full alignment. Lines used for this unit, quoted exactly:
  - Presentational, Novice Low (PDF page 23): function "I can name", context "very familiar people, places, and objects with the help of gestures, facial expressions, or visuals" (outcomes 1 and 2).
  - Interpersonal, Novice Low (PDF page 19): "I can provide information by answering a few simple questions", context "on very familiar topics, with the help of gestures,

facial expressions, and visuals", text type "using practiced or memorized words and phrases" (outcomes 2 to 5).
    - Interpersonal, Novice Mid (PDF page 19): "I can request and provide information by asking and answering simple questions" (the pair riddle game in lesson 5, a stretch for some children).
    - Presentational writing, Novice Low (PDF page 23): "I can label familiar people, places, and objects in pictures and posters." (the class animal poster in lesson 5, where children stick ready-written word labels on the picture).
- Wikipedia, "Information gap task": https://en.wikipedia.org/wiki/Information_gap_task (read 9 November 2026). Learners are missing information and must communicate to fill the gap. The pair riddle game in lesson 5 is an information gap: only the child making the riddle knows the animal.
- Wikipedia, "Total physical response": https://en.wikipedia.org/wiki/Total_physical_response . As in earlier units: commands answered with actions, listening before speaking, low stress (lessons 1 and 2).

Known gaps and cautions

- Two other agents (Gemini 4 Carbon and Gemini 4 Argon, both at e302480) text-checked this unit on 2026-11-11 and reported no errors. Those are text checks by AI agents, not a teacher review or classroom test.
- **No pronunciation help**, as in earlier units. Use a fluent speaker's recording if needed.
- **Grammar differs:** this unit cannot say how "in the forest", size and colour words, or "it has" work in your language (see the grammar warning). Check with a fluent speaker.
- **Word choices are the author's.** The Can-Do Statements describe what learners can do; they do not list words for a grade 2 class. The six new animals and four places were chosen because they are easy to draw and act; swap them for local animals and places if needed (and change the riddles to keep one answer each).
- **The animal table is a game rule, not science.** Where real animals live is a science topic; this unit does not teach it, and children who say "ducks live on farms too" are right.
- **Animal sounds are left out**, as in kindergarten, because they differ between languages. A teacher may add the language's own animal sounds.
- Timings are untested. The riddles use only two sentences each; longer riddles are a possible extension.

The lesson order matters: children meet the animals (lesson 1) before placing them (lesson 2), learn size and colour phrases (lesson 3) and "has" (lesson 4) before putting sentences together into riddles and the check (lesson 5).

Lesson 1: Six new animals

Unit overview - Next: Lesson 2: Where does it live?

Goal: Children point to or act out twelve animals (six from kindergarten and six new ones) when the teacher names them.

Length: about 30 minutes.

Materials

- The word card.
- The twelve large animal picture cards.
- Tick and cross cards (not needed today, but keep them to hand).
- Ear defenders and a quiet spot.
- Optional: the toy animals for blind or low-vision children.

Steps

✎ Opening (3 min)

Greeting chant. Then say each kindergarten animal word and do its action; children copy: **[cat]** (lick a paw), **[dog]** (wag a tail), **[bird]** (flap), **[fish]** (swimming hand), **[frog]** (hop, or bounce hands on knees), **[duck]** (waddle, or a beak with one hand).

Warm-up: do what I say (7 min)

Hold up the six kindergarten animal cards one by one and say the word; children do the action. Then put the cards down and **only say** the words, in a mixed order, faster and slower; children do the action. Finish with three slow ones so everyone succeeds. This is listening practice: children do not need to say anything.

✎ Main activity: six new animals (12 min)

1. **Meet the new animals (5 min).** Hold up each new card, say the word three times, and show its action. Children copy the action and may say the word:
   - **[horse]**: gallop on the spot (seated: tap hands fast on knees);
   - **[cow]**: two fingers as horns on the head, then chew slowly;
   - **[sheep]**: draw small curly circles on top of your head (the wool);
   - **[pig]**: a loose fist in front of your nose (the snout);
   - **[rabbit]**: two fingers up as ears, small hops (seated: one hand hops on the table);
   - **[bear]**: big slow paws, swaying from side to side.
2. **Animal parade (4 min).** Say the twelve animals in a mixed order, old and new; children do the action. Every few words, hold up the card **after** the children have moved, so they can see if they were right.

3. **Which card? (3 min).** Stick the twelve cards in a row on the board. Say a word; a volunteer comes and points to the card (or the whole class points from their seats). Volunteers may be helped by a friend.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Which animals did we know already from kindergarten?" (Cat, dog, bird, fish, frog, duck.)
- "Which action helped you remember a new animal word? Why?" (Any answer; for example, the rabbit ears, because they look like a rabbit.)

✓ Closing check (with answers) (5 min)

Hold up two cards, one in each hand. Say one word with **no action**. Children point to the hand with that animal (or say "this hand" by tapping the left or right side of their table). Do four rounds:

1. Left hand horse, right hand cow; say **[horse]**.
2. Left hand cat, right hand rabbit; say **[rabbit]**.
3. Left hand bear, right hand dog; say **[bear]**.
4. Left hand sheep, right hand pig; say **[pig]**.

Answers: left; right; left; right.

Vocabulary

[horse], **[cow]**, **[sheep]**, **[pig]**, **[rabbit]**, **[bear]**; review **[cat]**, **[dog]**, **[bird]**, **[fish]**, **[frog]**, **[duck]**.

Differentiation

- **Support:** in the parade and the check, use only the six new animals; let the child copy a partner's action first.
- **Stretch:** a child says a word and the class does the action (the child is the "teacher").

⚠ Safety

- Actions are done on the spot, with space between children. Every action has a seated version.

Teacher notes

- **Never ask about pets.** If a child says "I have a dog", smile, say **[dog]** with the action, and go on.

- No child has to act out an animal they do not want to (some children are frightened of dogs or bears); they can point to the card instead.
- Blind children hold the toy animal while you say its word, and do the action with the class.
- If the language is a sign language, the animal signs are the words; the actions above are only for hearing classes and may be left out.

Lesson 2: Where does it live?

Unit overview - Previous: Lesson 1: Six new animals - Next: Lesson 3: A big brown bear

Goal: Children understand **[It lives in the ___]** and point to the right place (house, farm, forest, pond) when asked **[Where does the ___ live?]** about an animal card.

Length: about 30 minutes.

Materials

- The word card.
- The twelve large animal picture cards.
- The four large place cards: house, farm, forest, pond.
- The four place mats, taped flat to the floor in four corners of the room before the lesson.
- The small animal cards from the pair card sets: one animal card per child (with 24 or more children, each animal is used two or three times).
- Ear defenders and a quiet spot.
- Optional: the toy animals and the tactile place cards for blind or low-vision children.

Steps

✎ Opening (3 min)

Greeting chant. A quick animal parade: say six animals (three old, three new); children do the actions.

Warm-up: four places (7 min)

1. Hold up each place card, say the word three times and do the gesture (point to the card): **[house]**, **[farm]**, **[forest]**, **[pond]**. Children may say the words.
2. Stick the four place cards on the board in this order and write a large number above each: **1** house, **2** farm, **3** forest, **4** pond. Say a place; children hold up that many fingers (or point).
3. In the school language, explain the game rule: "In our game, every animal has **one** home. Real animals can live in lots of places: ducks live on farms and in parks too. But in our game, the duck's place is the pond."

✎ Main activity: walk to the place (12 min)

1. **Hear it (4 min).** Hold up each large animal card and say where it lives, with the gesture (point to the animal, then sweep your hand to the place card): **[The horse lives on the farm.]** Do all twelve, following the table in the unit overview. Children only listen and watch.
2. **Walk to the place (5 min).** Give each child one small animal card. Say a sentence, for example **[The rabbit lives in the forest.]** Children holding a rabbit walk to the forest mat (or point from their seat, or a partner carries the card). Do all twelve

animals; children stay on their mat. At the end, each mat has its animals: walk round and say them together, **[On the farm: horse, cow, sheep, pig.]**

3. **Point to it (3 min).** Children go back to their seats. Hold up a large animal card and ask **[Where does the ___ live?]** with the open-hand gesture; children point to the right corner of the room or hold up the number of the place card.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Do ducks only live on ponds?" (No. Real ducks live on farms, in parks and in many places. In our game the duck's place is the pond.)
- "Which word helped you find your corner?" (The place word: house, farm, forest or pond.)

✓ Closing check (with answers) (5 min)

Hold up an animal card and ask, with no gesture, **[Where does the ___ live?]** Children hold up the number of the place card on the board (1 house, 2 farm, 3 forest, 4 pond), or say or sign the place:

1. frog
2. cow
3. rabbit
4. cat

Answers: 4 (pond); 2 (farm); 3 (forest); 1 (house).

Vocabulary

[house], **[farm]**, **[forest]**, **[pond]**, **[It lives in the ___]**, **[Where does ___ live?]**; review the twelve animals and the numbers one to four.

Differentiation

- **Support:** use only two places (farm and pond) and their animals; the child walks with a partner.
- **Stretch:** a child says a sentence for the class, **[The pig lives on the farm]**, and the others check by pointing.

⚠ Safety

- Children walk, not run. Keep the mats taped flat and the paths between them clear.

Teacher notes

- **"Where does it live?" is about the cards only.** Never ask children where they live, what their home is like or whether they have pets. If a child tells you, listen kindly and go back to the game.
- "In the forest", "on the farm" and "at the pond" may use different little words, or none, in your language. Say each sentence the way the language says it; children only need to understand it.
- Blind children hold a toy animal and are guided to the right mat by a partner; they learn the places by touching the tactile place cards while you say the words.

Lesson 3: A big brown bear

Unit overview - Previous: Lesson 2: Where does it live? - Next: Lesson 4: It has wings

Goal: Children understand **[big]**, **[small]**, **[It is big]** and **[It is brown]**, and pick out an animal picture by size and colour, for example **[the small black bear]**.

Length: about 30 minutes.

Materials

- The word card.
- The twelve large animal picture cards.
- The ten large colour cards from term 1.
- One set of eight size cards per pair (big brown bear, small brown bear, big black bear, small black bear, big white rabbit, small white rabbit, big brown rabbit, small brown rabbit).
- Ear defenders and a quiet spot.
- Optional: the tactile size cards (big and small felt bear and rabbit shapes) for blind or low-vision children.

Steps

✎ Opening (3 min)

Greeting chant. Stick the ten colour cards on the board. Say colours in a mixed order; children point. Finish with **[brown]**, **[black]** and **[white]**, the colours used today.

Warm-up: big or small? (7 min)

1. Say **[big]** with hands wide apart and **[small]** with finger and thumb close together. Children copy. Say the words in a mixed order; children show the gesture.
2. Hold up animal cards and say **[It is big]** or **[It is small]**, following the table in the unit overview (horse, cow, bear and dog big; cat, rabbit, frog and duck small). Children copy the gesture. Then hold up a card and only ask with the gesture of a question (palms up); children show big or small.
3. Hold up the bear card and say **[It is big. It is brown.]** pointing to the brown colour card. Do the same with the sheep (**[It is small. It is white.]**) and the cat (**[It is small. It is black.]**).

✎ Main activity: which bear? (12 min)

1. **Model it (2 min).** Lay out one set of size cards where the class can see (on a table with children around, or under a document camera if you have one). Say **[the big black bear]** and pick up that card. Do one more: **[the small white rabbit]**.
2. **Find it in pairs (6 min).** Each pair lays out its eight size cards face up. Say a phrase, for example **[the small brown bear]**; pairs point to the card together and hold it up. Look round, then put it back. Do all eight cards in a mixed order.

3. **Partner turn (4 min).** One child chooses a card in their head and shows it to the partner with the size gesture and the colour word (said, signed, or by pointing to the colour card on the board), then the word **[bear]** or **[rabbit]** (said, signed or with the rabbit-ears or big-paws action). The partner picks up the card. Swap.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Why did you need two words to find the right bear?" (Because two bears are brown and two bears are small; only size **and** colour together tell you which one.)
- "Is a small bear smaller than a big rabbit in real life?" (No, a real bear is much bigger than any rabbit. "Big" and "small" in our game only compare the pictures with each other.)

✓ Closing check (with answers) (5 min)

Each pair lays out only the four rabbit size cards. Say each phrase with no gesture; pairs hold up the card:

1. **[the big white rabbit]**
2. **[the small brown rabbit]**
3. **[the small white rabbit]**

Answers: the big white one; the small brown one; the small white one. Note which pairs hesitate; play the main activity again with them later.

Vocabulary

[big], **[small]**, **[It is ___]**; review **[brown]**, **[black]**, **[white]**, **[bear]**, **[rabbit]** and the other colours.

Differentiation

- **Support:** use only the four bear cards; or say only the size or only the colour, with two cards to choose from.
- **Stretch:** describe a card in a full phrase for the partner, **[the big brown rabbit]**, said or signed.

⚠ Safety

- Nothing to note beyond the usual classroom rules.

Teacher notes

- In many languages size and colour words come after the animal, or change their ending with it. Say the phrase the way the language says it; children only need to understand it.
- Brown, black and white were chosen because they are usually easy to tell apart. If a child mixes up only colours, note it privately (see the unit overview); do not count it as a language gap.
- Blind children use the tactile size cards: they find **[the big bear]** and **[the small rabbit]** by touch, and hear the colour words without being asked to use them.

Lesson 4: It has wings

Unit overview - Previous: Lesson 3: A big brown bear - Next: Lesson 5: Little Hill animal riddles

Goal: Children understand **[It has wings]**, **[It has a tail]**, **[It has four legs]** and **[It has two legs]**, sort animals by them, and solve their first two-sentence riddles.

Length: about 30 minutes.

Materials

- The word card.
- The twelve large animal picture cards and the four large place cards.
- The four large "has" cards: a wing, a tail, four legs, two legs.
- One small card set per pair (only the twelve animal cards are needed today).
- Ear defenders and a quiet spot.
- Optional: the toy animals for blind or low-vision children.

Steps

✎ Opening (3 min)

Greeting chant. Hold up three animal cards (horse, frog, rabbit) and ask **[Where does the ___ live?]**; children point to the place card on the board.

Warm-up: it has... (7 min)

1. Hold up each "has" card and say the phrase with its gesture: **[It has wings]** (flap both hands), **[It has a tail]** (wiggle one hand behind your back), **[It has four legs]** (four fingers walking on the table), **[It has two legs]** (two fingers walking). Children copy.
2. Hold up the duck card: **[It has wings. It has two legs.]** Then the horse: **[It has four legs. It has a tail.]** Then the fish: **[It has a tail.]** Children copy the gestures.
3. Say a "has" phrase without a card; children do the gesture.

✎ Main activity: sort and solve (12 min)

1. **Sort (6 min).** Each pair lays out its twelve small animal cards. Hold up a "has" card and say the phrase; pairs push forward every animal that has it. Check together, then push them back. Do three rounds:

    - **[It has wings]**: bird, duck.
    - **[It has two legs]**: bird, duck.
    - **[It has four legs]**: cat, dog, horse, cow, sheep, pig, rabbit, bear, frog.

    (Leave "a tail" out of the sorting: a bear's tail is very short, and the frog card has none, so it starts arguments. It stays as a word.) 2. **First riddles (6 min).** Stick the twelve large animal cards on the board. Say each riddle slowly, twice, with the gestures; pairs find the animal among their small cards and hold it up. Then a volunteer points to it on

the board. 1. **[It lives in the pond. It has wings. What is it?]** (duck) 2. **[It lives in the forest. It has wings. What is it?]** (bird) 3. **[It lives on the farm. It is pink. What is it?]** (pig) 4. **[It lives in the house. It is big. What is it?]** (dog) 5. **[It lives in the pond. It is orange. What is it?]** (fish) 6. Stretch, three sentences: **[It lives on the farm. It is big. It is brown. What is it?]** (horse)

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Why does a riddle need two sentences?" (One sentence fits lots of animals: three animals live in the pond. The second sentence shows which one.)
- "Which animals have wings?" (The bird and the duck.)

✓ Closing check (with answers) (5 min)

Say each riddle twice, with **no gestures**. Pairs hold up the small card:

1. **[It lives in the house. It is small. What is it?]**
2. **[It lives in the pond. It is green. What is it?]**
3. **[It lives on the farm. It is black and white. What is it?]**

Answers: cat; frog; cow.

Vocabulary

[It has ___], **[wings]**, **[a tail]**, **[four legs]**, **[two legs]**, **[What is it?]**; review the animals, places, sizes and colours.

Differentiation

- **Support:** give the pair only the animals for one place (for example the four farm animals), so each riddle has fewer choices.
- **Stretch:** after the closing check, a child makes up a riddle for the class (said, signed, or by holding up a place card and a "has" card).

⚠ Safety

- Nothing to note beyond the usual classroom rules.

Teacher notes

- "It has" may be a different verb, or a phrase like "with it are", in your language; "it" may change with the animal or be left out. Say it the way the language says it.
- Colour clues (pink, orange, green, black and white) help most children, but a child who cannot tell some colours apart may get those riddles wrong for a reason that is not language. The one-to-one check uses riddles that need no colour.

- Blind children sort the toy animals by touch (wings, legs) and solve the riddles with the toys.

Lesson 5: Little Hill animal riddles

Unit overview - Previous: Lesson 4: It has wings

Goal: Children use what they have learned to place animals on a class poster, solve and make riddles in pairs, and show what they know in a short one-to-one check.

Length: about 30 minutes (the one-to-one check is spread over the week).

Materials

- The word card.
- The twelve large animal picture cards, the four large place cards and the four large "has" cards, stuck on the board.
- The class animal poster, the spare set of twelve small animal cards, and the twelve word labels (written by the teacher), with tape or reusable putty (teacher only).
- One small card set per pair (twelve animals, four places, four "has" cards) and one riddle strip per pair.
- **Check things:** the six new animal cards (horse, cow, sheep, pig, rabbit, bear); the four place cards; the four bear size cards; the bird, fish and horse cards; the duck, frog, fish, bear, rabbit and bird cards; the record sheet (class list with five columns).
- Ear defenders and a quiet spot.
- Optional: the toy animals, tactile place cards and tactile size cards for blind or low-vision children.

Steps

✎ Opening (3 min)

Greeting chant. Do the four "has" gestures together, then ask **[Where does the duck live?]** and **[Where does the bear live?]**; children point to the place cards.

Warm-up: our animal poster (5 min)

Hold up a small animal card and say where it lives: **[The cow lives on the farm.]** A volunteer sticks the card on the right place on the poster (the teacher fixes it with putty). Then hold up two word labels, read each one aloud, and ask **[Which one says "cow"?]**; the volunteer points, and you stick that label beside the animal. Do six animals now; finish the other six at odd moments in the week. The poster stays on the wall.

✎ Main activity: the riddle game (14 min)

1. **Model it (2 min).** With a volunteer, show the game at the front. Think of an animal (the bear), and put two clue cards on the riddle strip: the forest place card and the four-legs "has" card. Say **[It lives in the forest. It has four legs. What is it?]** The volunteer points to an animal. If it is the rabbit, show **[no]**: two animals fit, so add a third clue, **[It is big]** (the gesture). The volunteer points to the bear: **[yes]**.

2. **Play in pairs (8 min).** Each pair lays out the twelve animal cards face up, with the place and "has" cards in a pile. The riddle-maker thinks of an animal (without touching it), puts a place card and a "has" card on the strip (or says a size or colour as the second clue), and may say the riddle. The partner points to an animal; the riddle-maker answers **[yes]** or **[no]**, and adds a clue if two animals fit. Swap after each riddle. Walk round and help with words, not with the answers.
3. **Checks begin (4 min).** While pairs keep playing, start the one-to-one check (see below) with one or two children. Carry on with the rest of the class over the week.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "When was a riddle hard to guess?" (When two animals fit both clues; for example, the forest and four legs fit the rabbit and the bear. Then you need one more clue.)
- "What clue helped you most?" (Any answer; for example, the place, because it leaves only three or four animals.)

✓ Closing check (with answers) (5 min)

Say each riddle twice, with no gestures. Pairs hold up the small card:

1. **[It lives in the house. It is brown. What is it?]**
2. **[It lives on the farm. It is small. It is white. What is it?]**
3. **[It lives in the pond. It is yellow. What is it?]**

Answers: dog; sheep; duck.

One-to-one check (about 3 minutes each child, over the week)

Use the five parts in the unit overview's Assessment section, with no gestures and no pointing. Record each part as **yes**, **with help** or **not yet**. In short:

1. Point to **[horse]**, **[rabbit]**, **[bear]** and **[pig]** among the six new animal cards (yes = four of four).
2. **[Where does the fish / the cow / the bear live?]** with the four place cards (pond, farm, forest; yes = three of three).
3. **[the small brown bear]** and **[the big black bear]** among the four bear size cards (yes = both; blind children: see the overview).
4. With the bird, fish and horse cards: **[It has wings. What is it?]** (bird), **[It has four legs. What is it?]** (horse) (yes = both).
5. With the duck, frog, fish, bear, rabbit and bird cards: **[It lives in the forest. It is big. What is it?]** (bear), **[It lives in the pond. It has four legs. What is it?]** (frog) (yes = both).

Doing it in their own way counts as **yes**. Saying a riddle aloud is a stretch and is not recorded.

Vocabulary

Review of the whole unit: the twelve animals, **[house]**, **[farm]**, **[forest]**, **[pond]**, **[It lives in the ___]**, **[big]**, **[small]**, **[It is ___]**, **[It has ___]**, **[What is it?]**, **[yes]**, **[no]**.

Differentiation

- **Support:** play the riddle game with only the animals of two places (for example the farm and the pond); the riddle-maker only puts cards on the strip and does not speak.
- **Stretch:** make a three-clue riddle and say or sign all of it; or stick a word label on the poster without help after hearing the word.

⚠ Safety

- The teacher handles the tape or putty. Children do not climb to reach the poster; put it low on the wall.

Teacher notes

- The riddle game is an information gap: only the riddle-maker knows the animal, so the partner really needs the clues.
- Some clue pairs fit two animals (forest and four legs; farm and four legs). That is part of the game: a third clue solves it.
- **Never ask about children's own pets or homes**, even in the riddle game ("Make a riddle about your dog" is not used). Riddles are about the Little Hill animal cards only.
- Blind children play with the toy animals and tactile place cards, and the partner reads the strip aloud.

Grade 2 Second Language: A Short Scene (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 11 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check it against your school's rules before use. Every hidden or lost thing in this unit is a class prop (a class crayon, a class book, a class bag). Children are never asked where their own things are, and nobody looks in another child's bag, tray or desk.
>
> Text-checked by three other agents (Gemini 3.8 Flash, Gemini 4 Argon and Gemini 4 Carbon); see Known gaps.

Back to the grade 2 year plan - Term 3. Builds on grade 2 term 2: Animals and Where They Live, grade 2 term 1: Things in the Classroom, and grade 1 term 3: A Picture Story with Yes/No and "Who?" Questions.

In grade 1 children listened to a picture story about Bear, Duck, Hen and Mouse and answered questions about it. In term 1 of grade 2 they learned classroom words and colours; in term 2 they learned **[It is ___]** and short describing sentences. This unit adds three place words, **[in]**, **[on]** and **[under]**, the question **[Where is ___?]**, the answer **[It is in / on / under the ___]**, the yes/no question **[Is it in / on / under the ___?]** and **[Here it is!]**. At the end, small groups act out a short picture story, "Where is the red crayon?", with simple props.

Which language?

This unit works with any language the school teaches. Before lesson 1, fill in the **word card** below. In the lessons, words in square brackets, like **[It is under the table]**, mean "say this in the language you are teaching".

English meaning	Your language	Gesture or picture to go with it
in		one hand drops into the other, cupped hand
on		one flat hand rests on top of the other fist
under		one flat hand, palm down, stays still; the other hand slides underneath it
Where is ___?		palms up, shoulders up, looking left and right
It is in / on / under the ___		point to the thing, then do the place gesture
Is it in / on / under the ___?		the place gesture, with eyebrows up
Here it is!		both hands hold up the thing
box		the class box or its picture card
(review from term 1) book, chair, table, pencil, crayon, ruler, bag, red		point to the real object or colour card
(review from grade 1) bear, duck, hen, mouse, happy, sad, Oh no!, The end		the grade 1 character actions and gestures

English meaning	Your language	Gesture or picture to go with it
(review) yes, no, thank you		as in earlier units (or the tick and cross cards)

Character actions (as in grade 1): **bear** = slow, heavy steps with big paws; **duck** = waddle, or a beak made with one hand; **hen** = peck with the head and tuck the hands in like wings; **mouse** = two fingers make whiskers by the nose.

Grammar warning: languages differ a lot here. "In", "on" and "under" may be separate little words before the noun, words after the noun, or endings on the noun; the noun itself may change after them. Some languages use one word for both "in" and "on", or different words for "on a table" and "on a wall". "Where is" may change with the thing, and "it" may be a different word for different things, or be left out. Yes/no questions are made in different ways (a question word, a change in word order, or just a questioning voice). Say every phrase the way the language really says it. Children only need to **understand** the phrases and **show** their answers; saying them is invited, never required.

Gesture warning: if thumbs up or thumbs down is rude where you live, use the tick and cross cards (or the school's usual signs) everywhere this unit says "yes or no".

The story: "Where is the red crayon?"

Six picture cards (an original story by the author, CC0, free to change; draw them simply, any style is fine):

1. Mouse sits at a table with paper, looking sad. **[Oh no! Where is the red crayon?]**
2. Duck looks into a bag. **[Is it in the bag?]** Duck shakes their head: **[No.]**
3. Hen looks at a chair. **[Is it on the chair?]** Hen shakes their head: **[No.]**
4. Bear bends down and looks under the table. **[Is it under the table? Yes! Here it is!]**
5. Bear gives Mouse the red crayon. Mouse is happy: **[Thank you!]**
6. Mouse holds up a drawing of the four friends. Everyone is happy. **[The end.]**

Draw sad and happy faces clearly (mouth shape **and** a tear for sad), not by colour. Draw the crayon with a thick black outline so it can be found without seeing red.

Big idea

We can **say where things are** with a few practised words, **ask where something is**, and use those words with gestures and props to **act out a short story together**.

Outcomes

By the end of the unit, most children can:

1. Put a class object **[in]**, **[on]** or **[under]** another object when the teacher says so, and show the matching gesture.
2. Answer **[Where is the ___?]** about a class object or a story picture by pointing, placing, gesturing or saying **[It is in / on / under the ___]**.
3. Answer **[Is it in / on / under the ___?]** with **[yes]** or **[no]**.
4. Follow the picture story: point to the story card that matches a sentence they hear.

5. Take part in a small-group scene of the story with props, in any role (speaking, acting, holding the cards or moving the props); some children also ask **[Where is ___?]** in a pair game.

Prior knowledge

- A Picture Story with Yes/No and "Who?" Questions (grade 1 term 3): **[bear]**, **[duck]**, **[hen]**, **[mouse]** and their actions; **[happy]**, **[sad]**, **[Oh no!]**, **[The end]**; answering questions about picture cards.
- Things in the Classroom (grade 2 term 1): **[book]**, **[chair]**, **[table]**, **[pencil]**, **[crayon]**, **[ruler]**, **[bag]**, the colours; **[yes]**, **[no]**, **[thank you]**; a pair game with questions.
- Animals and Where They Live (grade 2 term 2): **[It is ___]** and short two-sentence clues.
- Children who missed earlier units can still take part; every word has a card, a prop or an action.

Lessons

Keep the 1-minute greeting chant at the start of each day.

Lesson	Title	Time	Core idea
1	In, on, under	30 min	Three place words with gestures; putting class objects in, on and under
2	Where is the crayon?	30 min	**[Where is ___?]** and **[Is it ___?]** in a class hiding game
3	Where is the red crayon? (the story)	30 min	The picture story with props; ordering the story cards
4	Where is the book? (pair game)	30 min	An information-gap pair game with picture sheets
5	Our short scene	30 min	Small-group scenes with props, and the one-to-one check

Timings: every lesson is 30 minutes (3 + 7 + 12 + 3 + 5; in lesson 5 the one-to-one check is spread over the week).

Materials

- The filled-in word card (above), kept where the teacher can see it.
- **Three large gesture cards:** in, on, under (a simple drawing of a ball in a box, on a box and under a box, with the hand gesture drawn beside it).
- **The six large story picture cards** (above), big enough to see from the back of the room.
- **The class props** for the story and the hiding game: one red crayon (thick, with a black band of tape round it), one cloth or paper bag, one classroom chair, one table, one lidless box (about shoe-box size), one book and a sheet of paper for Mouse's drawing. These belong to the class, not to a child.
- **A pair tray per pair** (lessons 1, 2 and 4): a small lidless box, a book, a pencil, a crayon and a ruler, all from the classroom.
- **A small set of story cards per group of four** (lessons 3 and 5): the six story pictures, card size.

- **Picture sheets per pair** (lesson 4): sheet A and sheet B (see lesson 4), a folder or book to stand up as a screen, one blank room sheet per child and four small object cards per child (book, pencil, crayon, ruler); plus a large copy of sheet A for the closing check.
- **Per group of four or five** (lesson 5): character cards for Bear, Duck, Hen and Mouse to hold or hang on a loop of soft string (or a clip-on badge), plus a "story card holder" card for a fifth role; a paper bag, a crayon from a pair tray and a sheet of paper. Each group uses its own classroom table and one of its chairs.
- **Tick and cross cards:** one of each per child, as in earlier units.
- **Check things** (lesson 5): one box, one book, one bag, one crayon, one pencil and one ruler on a small table; story cards 2, 3 and 4; the three gesture cards; the record sheet (class list with five columns).
- Ear defenders and a quiet spot, as in every unit.
- Optional, for blind or low-vision children: a second pair tray for the lesson 4 game, a **tactile story set** (story cards with a felt crayon shape glued in the place where it is found, and raised outlines of the bag, chair and table), and the class props to hold.
- Optional: a fluent speaker's recording of the word card.

⚠ Safety and access

Safety

- **Nobody stands or climbs on chairs or tables.** "On the chair" means the crayon goes on the chair. In the story, Bear bends down or kneels to look under the table; nobody crawls under it.
- Objects in the hiding game are hidden only in the three marked places (in the bag, in the box, on or under the class chair or table), never high up, and children walk, not run.
- Pencils and crayons stay in the pair tray when not in use; nothing small enough to swallow is used.
- String loops for character cards are soft and long enough to slip off easily (or use clip-on badges); never tie them.

Privacy

- **All hidden and lost things are class props.** Never ask "Where is your bag?" or "What is in your bag?", and never use a child's own belongings. Nobody looks in another child's bag, tray or desk.
- The story is about Mouse, not about a child who lost something. If a child talks about losing something of their own, listen kindly and go back to the game.

Taking part

- **Speaking and acting are optional.** Pointing, placing props, holding up cards, signs and gestures all count. In the scenes, holding the story cards or moving the props is a full role. Never make a child speak or act alone in front of others.
- **Scenes are shown only inside the group, or to one other group if the group wants.** There is no whole-class performance and no audience of parents.
- **Movement:** every gesture has a seated version. In the hiding game a partner can carry the object, or the child points from their seat. Wheelchair users place objects on a table at the right height, and "under" can be "under the book" on a tray.
- **Children new to the school language:** keep gestures identical every time and accept answers in any language.

- **Noise:** quiet spot and ear defenders allowed; in the hiding game the class answers with tick and cross cards, not shouting.

Seeing, hearing and colour

- **Colour vision:** the crayon has a black band, so it can be found without seeing red. If a child mixes up only colours, do not record it as a language gap.
- **Blind children:** place words are learned by touch: the child's hand goes in the box, on the box and under the box (ask first: "May I guide your hand?"). Use the tactile story set and the real props. Keep the check objects in fixed places and tell the child where each one is before asking.
- **Low-vision children:** large, high-contrast cards; seat them near the props.
- **Deaf or hard-of-hearing children:** keep your face visible; do the gesture every time you say the word.
- **If the language is a sign language:** place is shown with the hands in space, so the signs for "in", "on" and "under" may already show where the thing is. That is the language, and it is fine; in the check, ask the child to **place** or **point to** the object so you can see their answer.

Assessment

Lesson 5 includes a five-part check, done one-to-one (about 3 minutes each child; spread over the week). Put a box, a book, a bag, a crayon, a pencil and a ruler on a small table. Ask everything with no gesture and without pointing or looking at the answer. Record each part as **yes**, **with help** or **not yet**:

1. **Placing:** say **[Put the crayon in the box]**, **[Put the pencil on the book]** and **[Put the ruler under the book]**. Yes = three of three. (Then clear the table again.)
2. **Where is?:** while the child covers their eyes (or turns away), put the crayon in the bag and the pencil under the box. Ask **[Where is the crayon?]** (in the bag) and **[Where is the pencil?]** (under the box). The child may point, lift the bag or box, do the gesture or say it. Yes = both.
3. **Is it?:** put the ruler on the box while the child watches. Ask **[Is it under the box?]** (no) and **[Is it on the box?]** (yes). Yes = both.
4. **The story:** lay out story cards 2, 3 and 4, shuffled. Say **[It is under the table]** and ask the child to point to the card (card 4, Bear and the table). Then say **[Is it in the bag?]** and ask for the card (card 2, Duck and the bag). Yes = both.
5. **Gestures:** say **[in]**, **[on]** and **[under]** in a mixed order; the child points to the gesture card or does the gesture. Yes = three of three.

Doing it in their own way (pointing, signs, the child's usual access) counts as **yes**. "Not yet" is normal for some children; the games can be played again any time. Acting in the scene (outcome 5) and asking **[Where is ___?]** are **not** recorded: notice them, but do not score them.

Sources

- NCSSFL-ACTFL Can-Do Statements, Novice: https://www.actfl.org/uploads/files/general/Resources-Publications/Can-Do-Novice.pdf (read 10 November 2026; the quoted lines were checked against the rendered PDF pages). These are performance indicators and examples,

not a curriculum, and the unit is not a full alignment. Lines used for this unit, quoted exactly:
    - Interpersonal, Novice Low (PDF page 19): "I can provide information by answering a few simple questions", context "on very familiar topics, with the help of gestures, facial expressions, and visuals", text type "using practiced or memorized words and phrases" (outcomes 2 and 3).
    - Interpersonal, Novice Mid (PDF page 19): "I can request and provide information by asking and answering simple questions" (the pair game in lesson 4 and the hiding game in lesson 2, a stretch for some children).
    - Presentational, Novice Low (PDF page 23): function "I can name", context "very familiar people, places, and objects with the help of gestures, facial expressions, or visuals" (outcome 1 and the props in lesson 5).
    - Interpretive, fictional texts, Novice Low: "I can identify memorized or familiar words in short, straightforward fictional texts and media that are supported by gestures, facial expressions, or visuals" (outcome 4, the story in lesson 3).
- Wikipedia, "Total physical response": https://en.wikipedia.org/wiki/Total_physical_response . As in earlier units: commands answered with actions, listening before speaking, low stress (lessons 1 and 2).
- Wikipedia, "Information gap task": https://en.wikipedia.org/wiki/Information_gap_task (read 9 November 2026). Learners are missing information and must communicate to fill the gap. The pair game in lesson 4 is an information gap: only one partner can see where the things are.

Known gaps and cautions

- Three other agents (Gemini 3.8 Flash at af601f7; Gemini 4 Argon and Gemini 4 Carbon at 4d5ec45) text-checked this unit on 2026-11-11 and reported no errors. Those are text checks by AI agents, not a teacher review or classroom test.
- **No pronunciation help**, as in earlier units. Use a fluent speaker's recording if needed.
- **Grammar differs:** this unit cannot say how "in", "on" and "under" work in your language (see the grammar warning). Check with a fluent speaker.
- **Word choices and the story are the author's.** The Can-Do Statements describe what learners can do; they do not list words or stories for a grade 2 class. A text search of the Novice Can-Do PDF (11 November 2026) found no line about learners acting out a scene; the nearest is an interpretive example about identifying actions described in a scene from a play (PDF page 16), which is about understanding, not acting. The scene in lesson 5 is the author's choice of activity (from the year plan), not something a source asks for.
- **Only one new noun (box) is added**; the rest are review words. Classes that did not do the term 1 unit need the classroom words first.
- **The story is very short on purpose.** Longer scenes, new characters or new hiding places are possible extensions.
- Timings are untested.

The lesson order matters: children learn the three place words with real objects (lesson 1) before asking **[Where is ___?]** in a game (lesson 2), meet the story with props (lesson 3), practise asking and answering in pairs (lesson 4), and only then act the story in small groups and do the check (lesson 5).

Lesson 1: In, on, under

Unit overview - Next: Lesson 2: Where is the crayon?

Goal: Children understand **[in]**, **[on]** and **[under]**, show them with gestures, and put class objects in, on and under other objects when the teacher says so.

Length: about 30 minutes.

Materials

- The word card.
- The three large gesture cards (in, on, under), stuck on the board.
- The class props: the red crayon (with its black band), the box, the book, the chair and the table.
- One pair tray per pair: a small lidless box, a book, a pencil, a crayon and a ruler.
- Tick and cross cards (one of each per child).
- Ear defenders and a quiet spot.
- Optional: the class props for blind or low-vision children to hold.

Steps

✎ Opening (3 min)

Greeting chant. Hold up the book, the pencil, the crayon and the ruler, one at a time, and say each word; children point to the same thing in their pair tray. Then hold up the box and say the new word **[box]** three times; children point to their box.

Warm-up: three place words (7 min)

1. Hold up the red crayon. Put it **in** the box and say **[in]** while doing the "in" gesture (one hand drops into the other, cupped hand). Point to the "in" gesture card. Do it twice more.
2. Do the same with **[on]** (the crayon on the book; one flat hand rests on top of the other fist) and **[under]** (the crayon under the book; one flat hand stays still, the other slides underneath it).
3. **Show me.** Say **[in]**, **[on]** or **[under]** in a mixed order; children do the gesture. Start slowly, then speed up a little. Nobody is "out".
4. **What do you see?** Put the crayon in, on or under the box without speaking; children do the gesture. Then say the word together (saying it is invited, not required).

✎ Main activity: put it in, on, under (12 min)

1. **Teacher commands (6 min).** Pairs have their trays. Say one command at a time, with the gesture the first time and without it later:
    - **[Put the pencil in the box.]**
    - **[Put the crayon on the book.]**
    - **[Put the ruler under the book.]**

- **[Put the book on the box.]**
- **[Put the crayon under the box.]**
- **[Put the pencil on the book.]**

After each command, pairs put the things back in the tray. Walk round and look; if a pair is not sure, do the gesture again rather than telling them the answer. 2. **Big props (2 min).** Ask a volunteer to put the red crayon **[on the chair]**, then another to put it **[under the table]**, then **[in the box]**. Children who do not want to come to the front show the gesture from their seat. 3. **Pair turns (4 min).** One child points to a gesture card on the board (or does a gesture); the partner puts the crayon in, on or under the box. Swap after each turn. Children who want to may say the word too.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Which word was easiest to show with your hands? Why?" (Any answer; for example, "in", because the hand really goes inside.)
- "I put the crayon next to the box. Is it under the box?" (No. It is beside the box. "Under" means the box is on top of it.)

✓ Closing check (with answers) (5 min)

Put the red crayon in each place without speaking. Children show the gesture (or hold up the right finger: one for in, two for on, three for under, pointing to the gesture cards):

1. The crayon in the box.
2. The crayon under the book.
3. The crayon on the chair.

Answers: in; under; on.

Vocabulary

New: **[in]**, **[on]**, **[under]**, **[box]**, **[Put the ___ in / on / under the ___]**. Review: **[book]**, **[pencil]**, **[crayon]**, **[ruler]**, **[chair]**, **[table]**, **[red]**.

Differentiation

- **Support:** use only **[in]** and **[on]** at first, and add **[under]** when the child is ready; let a partner do the gesture together with the child.
- **Stretch:** give the partner a two-step command (**[Put the pencil in the box. Put the crayon on the book.]**), or say the place word aloud on each turn.

⚠ Safety

- Nobody stands or climbs on the chair or table: only the crayon goes on them.

- Pencils go back in the tray after each command.

Teacher notes and misconceptions

- Some children mix up **[on]** and **[under]** at first, because the two gestures use the same flat hand. Keep the gestures exactly the same each time, and say the word while you move the object.
- "Next to" is not taught in this unit. If a child puts the crayon next to the box for "under", show **[under]** again with the real box rather than saying "wrong".
- Blind children: ask "May I guide your hand?", then put their hand with the crayon in, on and under the box while you say the word.
- The pair trays and props belong to the class. Do not use children's own pencil cases or bags.

Lesson 2: Where is the crayon?

Unit overview - Previous: Lesson 1: In, on, under - Next: Lesson 3: Where is the red crayon? (the story)

Goal: Children understand **[Where is ___?]**, **[It is in / on / under the ___]**, **[Is it in / on / under the ___?]** and **[Here it is!]**, and use them in a class hiding game with one class crayon.

Length: about 30 minutes.

Materials

- The word card.
- The three large gesture cards (in, on, under), stuck on the board.
- The class props: the red crayon (with its black band), the bag, the box, the chair and the table, set out at the front where everyone can see them.
- One pair tray per pair: a small lidless box, a book, a pencil, a crayon and a ruler.
- Tick and cross cards (one of each per child).
- Ear defenders and a quiet spot.
- Optional: the class props for blind or low-vision children to hold.

Steps

✎ Opening (3 min)

Greeting chant. Play "Show me" from lesson 1: say **[in]**, **[on]** or **[under]**; children do the gesture.

Warm-up: where is it? (7 min)

1. While everyone watches, put the red crayon under the table. Do the "Where is?" gesture (palms up, shoulders up, looking left and right) and say **[Where is the crayon?]** Point to the crayon and answer yourself: **[It is under the table.]** Do this for three places: under the table, in the bag, on the chair.
2. Now ask the class **[Where is the crayon?]** after each move; children point to the crayon and do the gesture. Some may say **[It is in the bag]**.
3. **Is it?** Put the crayon on the chair. Ask **[Is it in the bag?]**; children hold up the cross card (**[no]**). Ask **[Is it on the chair?]**; children hold up the tick card (**[yes]**). Do two more.
4. Pick up the crayon, hold it up with both hands and say **[Here it is!]** Children copy the gesture.

✎ Main activity: the hiding game (12 min)

1. **Class game (7 min).** The six hiding places are: in the bag, in the box, on the chair, under the chair, on the table, under the table. Point to each one and say it. One volunteer (the finder) covers their eyes or turns to face the wall. Another volunteer (the hider) quietly puts the red crayon in one of the six places, while the class watches. The finder turns round and asks a question, for example **[Is it in the bag?]**, by saying it, or

by pointing to the bag and the "in" gesture card while the teacher says it. The class answers with tick or cross cards. After three questions, if the crayon is not found, the class shows the place with the gesture. When the finder finds it, everyone says **[Here it is!]** Play four or five rounds with different children.
2. **Pairs (5 min).** One child closes their eyes; the partner puts the pencil in, on or under the box or the book in the pair tray. The first child asks **[Where is the pencil?]** or **[Is it under the book?]** (or points to a place); the partner answers **[yes]** or **[no]** with the cards, or says **[It is in the box]**. Swap after each turn.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "How did the questions help the finder?" (Each **[no]** took a place away, so there were fewer places left to look.)
- "Why do we only hide the crayon in the six places we said?" (So that nobody climbs or looks in other people's things, and so the game is fair.)

✓ Closing check (with answers) (5 min)

Hide the crayon while everyone watches, then ask. Children hold up tick or cross cards, or point:

1. The crayon is under the table. **[Is it on the table?]**
2. The crayon is still under the table. **[Is it under the table?]**
3. The crayon is in the bag. **[Where is the crayon?]** (children point to the bag and do the "in" gesture)

Answers: no (cross); yes (tick); in the bag.

Vocabulary

New: **[Where is ___?]**, **[It is in / on / under the ___]**, **[Is it in / on / under the ___?]**, **[Here it is!]**. Review: **[in]**, **[on]**, **[under]**, **[bag]**, **[box]**, **[chair]**, **[table]**, **[crayon]**, **[pencil]**, **[yes]**, **[no]**.

Differentiation

- **Support:** in the class game, use only three hiding places (in the bag, on the chair, under the table); the finder may point instead of asking.
- **Stretch:** the finder asks every question aloud; or the hider answers with a whole sentence: **[No. It is not in the bag.]** (only if the teacher has added "not" to the word card).

⚠ Safety

- The hiding places are low and in plain sight of the class. Nobody climbs, crawls under furniture or runs; the finder bends down or kneels to look under the chair or table.

- The crayon is hidden only in the class bag and box, never in a child's bag, tray, desk or pocket.

Teacher notes and misconceptions

- Children often answer **[Where is ___?]** with **[yes]** or **[no]**. Show the difference with the gestures: "Where is?" is palms up and needs a place; "Is it?" has eyebrows up and needs yes or no.
- This is total physical response at first (children answer with actions) and becomes a simple information gap in the class game, because the finder does not know where the crayon is.
- Blind children can be the finder with a partner as guide: the partner places their hand near each place they ask about. Tell them the six places first, and keep the props in the same spots every time.

Lesson 3: Where is the red crayon? (the story)

Unit overview - Previous: Lesson 2: Where is the crayon? - Next: Lesson 4: Where is the book? (pair game)

Goal: Children follow a six-picture story, "Where is the red crayon?", told with real props, join in with the gestures and lines, and put the story cards in order.

Length: about 30 minutes.

Materials

- The word card.
- The six large story picture cards (see the unit overview).
- The three large gesture cards (in, on, under), stuck on the board.
- The class props: the red crayon (with its black band), the bag, the chair, the table, and a sheet of paper for Mouse's drawing.
- One small set of the six story cards per group of four, shuffled.
- Tick and cross cards (one of each per child).
- Ear defenders and a quiet spot.
- Optional: the tactile story set for blind or low-vision children.

Steps

✎ Opening (3 min)

Greeting chant. Play one round of the hiding game from lesson 2 with the red crayon.

Warm-up: our four friends (7 min)

1. Hold up story card 6 (all four friends), point to each character and say the name with the grade 1 action: **[bear]** (slow, heavy steps), **[duck]** (waddle or a hand beak), **[hen]** (peck and tuck the hands in), **[mouse]** (finger whiskers). Children copy the action, seated or standing.
2. Review **[happy]** (big smile, both hands up), **[sad]** (one finger draws a tear), **[Oh no!]** (hands on cheeks) and **[thank you]**. Say a word; children show it.

✎ Main activity: the story (12 min)

1. **First telling (4 min).** Tell the story slowly with the large cards, and act each line with the real props (put the crayon under the table before you start, without saying anything):
    - Card 1: sit at the table with the paper, look sad. **[Oh no! Where is the red crayon?]**
    - Card 2: look into the bag. **[Is it in the bag?]** Shake your head. **[No.]**
    - Card 3: look at the chair. **[Is it on the chair?]** Shake your head. **[No.]**
    - Card 4: bend down and look under the table. **[Is it under the table? Yes! Here it is!]**

    - Card 5: give the crayon to "Mouse" (put it on the paper). **[Thank you!]** Look happy.
    - Card 6: hold up the paper. **[The end.]**
2. **Second telling (4 min).** Tell it again. This time children do the gestures with you (Oh no!, Where is?, in, on, under, Here it is!, happy) and say any lines they want to. Pause before **[No.]** and **[Here it is!]** so children can answer.
3. **Story cards in order (4 min).** Groups of four lay out their six small story cards. Say the line for one card at a time, in story order, without showing the big card; the group finds the card and puts it in a row. At the end, show the big cards in order so groups can check.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "How did Mouse feel at the start, and at the end? Why?" (Sad at the start, because the red crayon was lost; happy at the end, because Bear found it and Mouse could draw.)
- "Who found the crayon, and where was it?" (Bear; under the table.)

✓ Closing check (with answers) (5 min)

Say one line from the story. Groups hold up the story card that matches it:

1. **[Is it on the chair? No.]**
2. **[Yes! Here it is!]**
3. **[Thank you!]**

Answers: card 3 (Hen and the chair); card 4 (Bear and the table); card 5 (Bear gives Mouse the crayon).

Vocabulary

Review of the whole story: **[bear]**, **[duck]**, **[hen]**, **[mouse]**, **[Oh no!]**, **[Where is the red crayon?]**, **[Is it in the bag?]**, **[Is it on the chair?]**, **[Is it under the table?]**, **[yes]**, **[no]**, **[Here it is!]**, **[thank you]**, **[happy]**, **[sad]**, **[The end]**.

Differentiation

- **Support:** give the group only cards 1, 4 and 6 to order (beginning, finding, end).
- **Stretch:** after the cards are in order, a child points to each card and says its line, or two children "read" the story to each other from the cards.

⚠ Safety

- When you act card 4, bend down or kneel; do not crawl under the table. Children copy the same way.

Teacher notes and misconceptions

- The story is told the same way every time. Children learn the lines by hearing them many times; they do not need to read them.
- Some children think the crayon "was in the bag first". If so, go back through cards 2 and 3 with the props: Duck looked and said **[No]**; Hen looked and said **[No]**.
- This story is about Mouse. Do not ask children to tell about things they have lost.
- Blind children follow the story with the tactile story set: guide their hand to the felt crayon on card 4 when you say **[Here it is!]**

Lesson 4: Where is the book? (pair game)

Unit overview - Previous: Lesson 3: Where is the red crayon? (the story) - Next: Lesson 5: Our short scene

Goal: Children ask and answer **[Where is the ___?]** in an information-gap pair game, placing small object cards on a picture of a room.

Length: about 30 minutes.

Materials

- The word card.
- The three large gesture cards (in, on, under), stuck on the board.
- The class props: the bag, the box, the chair and the table, at the front (children point to them as picture words in the game).
- **Picture sheets per pair:**
  - **Sheet A:** a simple drawing of a room with a table, a chair, a box and a bag. The book is on the chair, the pencil is under the table, the crayon is in the bag (its tip sticks out), and the ruler is in the box (its end sticks out).
  - **Sheet B:** the same room. The book is on the table, the pencil is in the box (its tip sticks out), the crayon is under the chair, and the ruler is in the bag (its end sticks out).
- **One blank room sheet per child:** the same room with the table, chair, box and bag, and nothing else.
- **Four small object cards per child:** a book, a pencil, a crayon and a ruler (simple drawings, big enough to hold and place).
- A large copy of sheet A for the closing check.
- A folder or book per pair to stand up as a screen.
- Tick and cross cards (one of each per child).
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: two pair trays (box, book, pencil, crayon, ruler) instead of sheets (see Teacher notes).

Steps

✎ Opening (3 min)

Greeting chant. Say three lines from the story and let children do the gestures: **[Is it in the bag?]**, **[Is it on the chair?]**, **[Is it under the table? Yes! Here it is!]**

Warm-up: the blank room (7 min)

1. Hold up a blank room sheet. Point to the table, the chair, the box and the bag, and say each word; children point to the same thing on their own blank sheet.
2. Say **[Put the book on the chair.]** Children put their book card on the chair on their blank sheet. Do three more: **[Put the pencil under the table]**, **[Put the crayon in the box]**, **[Put the ruler in the bag]**.

3. Children clear their sheets.

✎ Main activity: the pair game (12 min)

1. **Model it (2 min).** With a volunteer, show the game at the front. You hold sheet A behind a folder screen; the volunteer has a blank room sheet and the four object cards. The volunteer asks **[Where is the book?]** (or holds up the book card with the "Where is?" gesture). You answer **[It is on the chair]**, pointing to the "on" gesture card and to the class chair. The volunteer puts the book card on the chair.
2. **Round 1 (4 min).** In each pair, child A has sheet A behind the screen; child B has a blank sheet and the four object cards. B asks about each object; A answers in words, or by pointing to a gesture card and a class prop (the bag, box, chair or table at the front). B places each card.
3. **Compare (1 min).** A lays sheet A beside B's sheet. Are the four things in the same places? Fix any that are not.
4. **Round 2 (4 min).** Swap: child B now has sheet B behind the screen, and child A has a blank sheet and the cards.
5. **Compare (1 min)** as before.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Why did you need to ask your partner?" (Because only your partner could see the picture. You did not know where the things were.)
- "What helped when a word was hard?" (Any answer; for example, pointing to the gesture card, doing the gesture, or pointing to the real chair.)

✓ Closing check (with answers) (5 min)

Show the large copy of sheet A. Children answer by pointing to the gesture cards and props, doing the gesture, or with tick and cross cards:

1. **[Where is the ruler?]**
2. **[Where is the pencil? Is it on the table?]**
3. **[Where is the crayon?]**

Answers: in the box; no (cross), it is under the table; in the bag.

Vocabulary

Review: **[Where is the ___?]**, **[It is in / on / under the ___]**, **[Put the ___ in / on / under the ___]**, **[book]**, **[pencil]**, **[crayon]**, **[ruler]**, **[table]**, **[chair]**, **[box]**, **[bag]**, **[yes]**, **[no]**.

Differentiation

- **Support:** play with only two objects (the book and the pencil); the child who answers may point only, and the teacher says the words with them.

- **Stretch:** the child who answers uses a whole sentence each time (**[It is under the table]**); or the pair makes its own sheet by drawing the four things in new places, and plays again.

⚠ Safety

- Pencil and crayon here are paper cards; no sharp objects are needed for this lesson.

Teacher notes and misconceptions

- This is an information gap: only one partner can see where the things are, so the other really needs to ask. That is the point of the game; do not let children look over the screen.
- On the sheets, things that are "in" the bag or box stick out a little, so they can be drawn. Tell the class: "It is in the bag; you can just see the end."
- Some children answer with the object name only ("chair"). Accept it, then show the place gesture and say the whole answer with them.
- **Blind or low-vision children** play with a real pair tray instead of sheets: the partner who knows puts the real things in, on or under the box and the book in one tray behind a screen; the child who asks places the things in a second tray as they are told, then compares the two trays by touch.

Lesson 5: Our short scene

Unit overview - Previous: Lesson 4: Where is the book? (pair game)

Goal: Children act out "Where is the red crayon?" in small groups with simple props, in any role they choose, and show what they know in a short one-to-one check.

Length: about 30 minutes (the one-to-one check is spread over the week).

Materials

- The word card.
- The six large story picture cards and the three large gesture cards, stuck on the board.
- The class props: the red crayon (with its black band), the bag, the box, the chair and the table (for the closing check).
- **Per group of four or five:** one set of character cards (Bear, Duck, Hen, Mouse, on soft string loops or clip-on badges) and a "story card holder" card; one small set of the six story cards; a paper bag; a crayon from a pair tray; a sheet of paper. The group uses its own classroom table and one of its chairs as the other props.
- **Check things:** one box, one book, one bag, one crayon, one pencil and one ruler on a small table; story cards 2, 3 and 4; the three gesture cards; the record sheet (class list with five columns).
- Tick and cross cards (one of each per child).
- Ear defenders and a quiet spot.
- Optional: the tactile story set and the class props for blind or low-vision children.

Steps

✎ Opening (3 min)

Greeting chant. Tell the story once with the big cards; children do the gestures and say any lines they like.

Warm-up: roles and props (7 min)

1. Show the five roles: **Mouse**, **Duck**, **Hen**, **Bear** and the **story card holder**, who holds up each story card at the right time and may say **[The end]**. Say clearly: "Every role is a real part of the scene. You can act, speak, hold the cards or move the props. Nobody has to speak."
2. Groups choose roles. In a group of four, the teacher or a neighbour group's card holder can help with the cards. A child who does not want a role helps set up the props.
3. Each group sets out its props: the paper goes on its table, the crayon goes under the table (put there before the scene starts), the bag goes on the floor by the table, and a chair stands nearby.

✎ Main activity: our short scene (12 min)

1. **Practise (6 min).** Each group acts the story twice, then swaps roles if they want to and acts it again. The story card holder shows each card; the actors do the actions and say their lines, or the card holder says the lines while the actors act. Walk round and help with words and order, not with acting.
2. **Show (4 min).** Groups that want to pair up with one other group and show their scene to each other; the watching group joins in with **[Here it is!]** and claps or shows "happy". Groups that do not want to show act the scene once more for themselves. There is no whole-class performance.
3. **Checks begin (2 min).** While groups tidy up and act again, start the one-to-one check (see below) with one or two children. Carry on with the rest of the class over the week.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "What did your group do well together?" (Any answer; for example, waiting for the card holder, or helping someone who forgot a line.)
- "How did the props help?" (Any answer; for example, they showed **in**, **on** and **under** without needing words, and made it easy to remember where to look.)

✓ Closing check (with answers) (5 min)

Use the class props. Children answer by pointing, doing the gesture, or with tick and cross cards:

1. Put the red crayon in the box. **[Where is the crayon?]**
2. With the crayon still in the box: **[Is it under the box?]**
3. Hold up story card 4. **[Who? Bear, Duck or Hen?]** (do the three actions) and **[Where is the crayon?]**

Answers: in the box; no (cross); Bear, and the crayon is under the table.

One-to-one check (about 3 minutes each child, over the week)

Use the five parts in the unit overview's Assessment section, with no gestures and no pointing. Record each part as **yes**, **with help** or **not yet**. In short:

1. **[Put the crayon in the box]**, **[Put the pencil on the book]**, **[Put the ruler under the book]** (yes = three of three).
2. With the crayon hidden in the bag and the pencil under the box: **[Where is the crayon?]** (in the bag), **[Where is the pencil?]** (under the box) (yes = both).
3. With the ruler on the box: **[Is it under the box?]** (no), **[Is it on the box?]** (yes) (yes = both).
4. With story cards 2, 3 and 4: **[It is under the table]** (card 4), **[Is it in the bag?]** (card 2) (yes = both).

5. **[in]**, **[on]**, **[under]** in a mixed order: the child points to the gesture card or does the gesture (yes = three of three).

Doing it in their own way counts as **yes**. Acting in the scene and asking **[Where is ___?]** are not recorded.

Vocabulary

Review of the whole unit: **[in]**, **[on]**, **[under]**, **[box]**, **[Where is ___?]**, **[It is in / on / under the ___]**, **[Is it in / on / under the ___?]**, **[Here it is!]**, the story lines, **[bear]**, **[duck]**, **[hen]**, **[mouse]**, **[Who?]**, **[happy]**, **[sad]**, **[yes]**, **[no]**, **[thank you]**, **[The end]**.

Differentiation

- **Support:** the card holder (or the teacher) says every line while the actors act; a child may act only the finding part (Bear).
- **Stretch:** the group changes the story: a different lost thing (the pencil or the ruler) or different places (in the box, on the table), and acts the new version; or a child says all the lines of one character.

⚠ Safety

- **Nobody stands or climbs on a chair or table, and nobody crawls under one.** Bear bends down or kneels to look under the table.
- Character-card loops are soft and long enough to slip off easily, or use clip-on badges.
- Leave walking space between groups.

Teacher notes and misconceptions

- Acting is optional, and so is speaking. A child who holds the cards, moves the props or helps set up has taken part. Never ask a child to act alone in front of the class.
- Some groups will want to act the scene again and again; that is good practice. Others finish quickly; offer the stretch (a new lost thing or new places).
- The scene is about Mouse's crayon. Do not let groups use a child's own belongings as the lost thing.
- Blind children can play any role. Bear's partner guides them to the table; the card holder can use the tactile story set and say each line.

Grade 3 Second Language: The Market (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 12 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check it against your school's rules before use. All money in this unit is made-up paper coins, and all shopping is done by story characters or in a class pretend shop. Children are never asked about their own or their family's money, shopping or food.
>
> Text-checked by three other agents (Gemini 3.8 Flash, Gemini 4 Carbon and Gemini 4 Argon); see Known gaps.

Back to the grade 3 year plan - Term 1. Builds on grade 2 term 3: A Short Scene, grade 1 term 1: Food Words and "I Like / I Don't Like", and kindergarten term 2: Numbers to Ten, Colours and Animals.

In grade 1 children learned ten food words; in kindergarten they counted to ten; in grade 2 they asked **[Where is ___?]** and acted a short scene. This unit adds four new food words, the numbers **[eleven]** to **[twenty]**, the tens **[ten]**, **[twenty]**, **[thirty]** ... **[one hundred]**, the word **[coins]**, the question **[How much is the ___?]**, the answer **[___ coins]**, and the polite request **[I would like the ___, please]** with **[Here you are]**. Children meet a short picture story, "Bear at the Market", then buy and sell picture-card food in a class pretend shop.

Which language?

This unit works with any language the school teaches. Before lesson 1, fill in the **word card** below. In the lessons, words in square brackets, like **[How much is the pear?]**, mean "say this in the language you are teaching".

English meaning	Your language	Gesture or picture to go with it
tomato, pear, fish, milk (new)		food picture cards
(review from grade 1) apple, banana, orange, grapes, carrot, bread, rice, egg, cheese, soup		food picture cards
eleven to twenty		the ten card plus a dot card (see Materials)
ten, twenty, thirty, forty, fifty, sixty, seventy, eighty, ninety, one hundred		that many paper coins (one coin = ten), or the tens number card
coins		hold up a paper coin
How much is the ___?		point to the food, then rub thumb and fingers together (or hold up a coin) with eyebrows up
___ coins		the number card, then a coin
I would like the ___, please		hand on chest, then point to the food card
Here you are		both hands hold the card out
		as in earlier units

English meaning	Your language	Gesture or picture to go with it
(review) hello, goodbye, please, thank you, yes, no, Oh no!, The end, one to ten		

About the coins: every paper coin in this unit is worth **ten**. A price of **[thirty coins]** means "thirty", paid with three paper coins. This keeps all prices in tens, so children only need the tens words to shop. The word **[coins]** is the language's ordinary word for coins; do not use the name of a real currency.

Number warning: languages build numbers in very different ways. Some say "ten-one, ten-two" for eleven and twelve; some have special words for the teens; some say the ones before the tens; some count in twenties for some numbers (for example, a word like "four twenties" for eighty); and the word for "one hundred" may or may not include "one". Say every number the way the language really says it, and teach only that way. If the language's way is very different from the school language, spend an extra lesson on the numbers before lesson 3.

Grammar warning: the noun may change after a number (for example, the plural form, or a special form after some numbers), so **[thirty coins]** may not follow the pattern of **[two coins]**. "The", "a" and "some" work differently in different languages, or do not exist; say **[I would like the pear, please]** in the way a shopkeeper would really hear it. Polite requests also differ: in some languages the most natural form is "Please give me **" or just "**, please". Use the form a fluent speaker would use at a market stall. Children only need to **understand** the phrases and **show** their answers; saying them is invited, never required.

Gesture warning: if rubbing thumb and fingers together means something rude or unkind where you live, hold up a paper coin instead. If thumbs up or thumbs down is rude, use the tick and cross cards (or the school's usual signs) everywhere this unit says "yes or no".

The prices at Hen's stall

Lessons 3 and 4, the story and the check use the same **price board** for Hen's stall (made up by the author; free to change, but change it everywhere). Lesson 5 adds a second stall, Goat's, with different prices (see lesson 5):

Food	Price
apple	10 coins
carrot	20 coins
pear	30 coins
banana	40 coins
egg	50 coins
tomato	60 coins
bread	70 coins
milk	80 coins
cheese	90 coins
fish	100 coins

Each tens number appears once, so the board is also a tens chart. Orange, grapes, rice and soup are review words in lesson 1 only; they are not sold at the stall.

The story: "Bear at the Market"

Six picture cards (an original story by the author, CC0, free to change; draw them simply, any style is fine). Bear has **five coins** (fifty), drawn as five round coins in Bear's paw or on a small tray Bear carries.

1. Bear walks up to Hen's stall with five coins. **[Hello, Hen!]** Hen waves: **[Hello, Bear!]**
2. Bear points to the cheese. **[How much is the cheese?]** Hen: **[Ninety coins.]** Bear counts five coins and looks surprised: **[Oh no!]**
3. Bear points to the bread. **[How much is the bread?]** Hen: **[Seventy coins.]** Bear shakes their head: **[Oh no!]**
4. Bear points to the pear. **[How much is the pear?]** Hen: **[Thirty coins.]** Bear smiles: **[I would like the pear, please.]**
5. Hen gives Bear the pear: **[Here you are.]** Bear gives Hen three coins: **[Thank you!]** Hen: **[Thank you! Goodbye!]**
6. Bear sits under a tree, eating the pear, with two coins left and a big smile. **[The end.]**

Draw Bear's surprise and smile with clear face shapes (mouth and eyebrows), not by colour. Draw the coins large, with "10" on each, so children can count them on the card.

Big idea

At a market we can **name foods**, **ask how much something costs**, **understand prices in tens up to a hundred**, and **ask politely for what we would like**, using a few practised phrases with picture cards and pretend coins.

Outcomes

By the end of the unit, most children can:

1. Point to the right picture card when the teacher names one of the fourteen food words (ten review words and four new ones).
2. Show a number from **[eleven]** to **[twenty]** when it is said (with the ten card and a dot card, a number card, or by saying it).
3. Show a tens number from **[ten]** to **[one hundred]** when it is said, by counting out paper coins or pointing to the number card.
4. Answer **[How much is the ___?]** from the price board by pointing to the number card, showing the coins or saying **[___ coins]**.
5. Understand **[I would like the ___, please]** by handing over the right food card, and take part in the pretend shop in any role (stallholder, customer or coin counter); some children also ask **[How much is the ___?]** themselves.

Prior knowledge

- Food Words and "I Like / I Don't Like" (grade 1 term 1): **[apple]**, **[banana]**, **[orange]**, **[grapes]**, **[carrot]**, **[bread]**, **[rice]**, **[egg]**, **[cheese]**, **[soup]**; **[please]**, **[thank you]**.
- Numbers to Ten, Colours and Animals (kindergarten term 2): **[one]** to **[ten]**; the dot cards.
- A Short Scene (grade 2 term 3): asking questions in a pair game; acting a short story with props; Bear, Duck, Hen and Mouse.

- Grade 3 mathematics term 1, Equal Groups and Arrays, counts equal groups; counting coins in tens is the same idea, but it is **not** needed here: children count coins one at a time if they like.
- Children who missed earlier units can still take part; every word has a card, a coin or a gesture.

Lessons

Keep the 1-minute greeting chant at the start of each day.

Lesson	Title	Time	Core idea
1	Food at the market	30 min	Fourteen food words (four new) with picture cards and a "what's missing?" game
2	Eleven to twenty	30 min	The numbers eleven to twenty with the ten card and dot cards
3	Tens and prices	30 min	Counting coins in tens to one hundred; **[How much is the ___?]** with the price board
4	Bear at the Market	30 min	The picture story; **[I would like the ___, please]**; a pretend shop in groups
5	Our price list (pair game)	30 min	An information-gap pair game with price lists, and the one-to-one check

Timings: every lesson is 30 minutes (3 + 7 + 12 + 3 + 5; in lesson 5 the one-to-one check is spread over the week).

Materials

- The filled-in word card (above), kept where the teacher can see it.
- **Fourteen large food picture cards:** apple, banana, orange, grapes, carrot, bread, rice, egg, cheese, soup (from grade 1) and tomato, pear, fish, milk (new). Big enough to see from the back of the room.
- **The large price board** (above): the ten stall foods, each with its price written as a numeral and drawn as that many coins.
- **Large number cards:** 11 to 20, and the tens 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 (numerals only).
- **The ten card:** a large card with ten dots in two rows of five. Use it with the kindergarten **dot cards** 1 to 10 (for 13: the ten card and the 3 dot card side by side).
- **Paper coins:** round coins cut from thick card, about 5 cm across, each marked "10". Ten large coins for the teacher, plus **ten coins per pair** (lessons 3 and 5) or **per group** (lesson 4). They are pretend coins, not real or toy money of any country.
- **The six large story picture cards** (above).
- **A pretend shop per group of three or four** (lesson 4): the ten stall food cards (small), a small copy of the price board, ten paper coins, a tray or lidless box for the stall, and six **shopping cards** (each shows one stall food; see lesson 4).
- **Price-list sheets per pair** (lesson 5): sheet A and sheet B for Goat's stall (see lesson 5), a folder or book to stand up as a screen, and a pencil per child; plus a large copy of Goat's full price list for the closing check.
- **Small number cards per pair** (lessons 2 and 3): 11 to 20 and the ten tens, small enough to lay out on a desk.
- **A cloth or large sheet of paper** to cover cards in the "what's missing?" game (lesson 1).

- **Tick and cross cards:** one of each per child, as in earlier units.
- **Check things** (lesson 5): eight small food cards (apple, carrot, pear, banana, bread, fish, tomato, milk), small number cards 11 to 20 and the ten tens, ten paper coins, the ten card and dot cards, the small price board, and the record sheet (class list with five columns).
- Ear defenders and a quiet spot, as in every unit.
- Optional, for blind or low-vision children: **tactile coins** (thick card with a raised dot or a punched hole in the centre, so each can be felt and counted), **tactile food cards** (a simple raised outline of each food) or large toy food that is too big to swallow, a **tactile ten card** (ten raised dots), and large-print copies of the lesson 5 sheets.
- Optional: a fluent speaker's recording of the word card and the numbers.

⚠ Safety and access

Safety

- **No real food is used**, because of allergies. Food is always picture cards (or large toy food for blind children). Nobody tastes anything.
- **No real money is used.** Coins are card, large enough that they cannot be swallowed.
- Children walk, not run, between stalls; stalls are on desks, not on the floor.

Privacy and money

- **Never ask** what children or their families buy, eat, can afford, or how much money they have, and never compare real prices. All shopping is done by Bear or in the pretend shop with the same ten coins for everyone.
- In the story, Bear cannot buy the cheese or the bread. Present it lightly: Bear chooses something else and is happy. If a child talks about money worries at home, listen kindly, go back to the game, and follow the school's usual steps for passing on a concern.
- Everyone in the pretend shop has the same coins, and everyone can buy something: every shopping card costs 100 coins or less.

Taking part

- **Speaking and acting are optional.** Pointing, handing over cards, counting out coins, holding up number cards and signs all count. In the pretend shop, being the stallholder, the customer or the coin counter is a full role. Never make a child speak or act alone in front of others.
- **Movement:** every gesture has a seated version. Children can stay at one stall and be visited, rather than walking between stalls.
- **Children new to the school language:** keep gestures identical every time and accept answers in any language.
- **Noise:** quiet spot and ear defenders allowed; in whole-class games children answer with cards, not shouting.

Seeing, hearing and colour

- **Colour vision:** food cards are drawn with clear shapes (a pear shape, a fish shape), so no food is known only by colour. If a child mixes up only colours, do not record it as a language gap.
- **Blind children:** use the tactile coins, tactile food cards or large toy food, and the tactile ten card. Keep the check things in fixed places and tell the child where each one is before asking. Counting coins by touch is a full answer.

- **Low-vision children:** large, high-contrast cards; seat them near the price board, or give them their own small copy.
- **Deaf or hard-of-hearing children:** keep your face visible; do the gesture or show the card every time you say the word.
- **If the language is a sign language:** number signs may look like the amount, and the sign for "how much" may already include a money sign. That is the language, and it is fine. In the check, if a sign shows its answer, ask the child to **point to** the number card, food card or coins instead, so the sign itself does not give the answer away.

Assessment

Lesson 5 includes a five-part check, done one-to-one (about 3 minutes each child; spread over the week). Ask everything with no gesture and without pointing or looking at the answer. Record each part as **yes**, **with help** or **not yet**:

1. **Food words:** lay out the eight small food cards (apple, carrot, pear, banana, bread, fish, tomato, milk), shuffled. Say **[tomato]**, **[fish]**, **[bread]** and **[pear]**; the child points to each. Yes = four of four.
2. **Eleven to twenty:** lay out the small number cards 11 to 20, shuffled. Say **[twelve]**, **[fifteen]** and **[nineteen]**; the child points to the card, or shows the number with the ten card and a dot card. Yes = three of three.
3. **Tens:** lay out the small tens cards, shuffled. Say **[thirty]**, **[seventy]** and **[one hundred]**; the child points to the card, or counts out that many paper coins (three, seven, ten). Yes = three of three.
4. **How much is?:** put the small price board in front of the child. Ask **[How much is the milk?]** (80) and **[How much is the carrot?]** (20). The child may point to the number on the board or the number card, count out coins, or say it. Yes = both.
5. **I would like:** put the eight food cards back in front of the child, who is the stallholder. Say **[I would like the banana, please]**, then **[I would like the fish, please]**. The child hands over each card. Yes = both.

Doing it in their own way (pointing, signs, coins, the child's usual access) counts as **yes**. "Not yet" is normal for some children; the games can be played again any time. Playing a role in the pretend shop and asking **[How much is the ___?]** (part of outcome 5) are **not** recorded: notice them, but do not score them.

Sources

- NCSSFL-ACTFL Can-Do Statements, Novice: https://www.actfl.org/uploads/files/general/Resources-Publications/Can-Do-Novice.pdf (read 12 November 2026; the quoted lines were checked against the rendered PDF pages). These are performance indicators and examples, not a curriculum, and the unit is not a full alignment. Lines used for this unit, quoted exactly:
  - Interpersonal, "How can I meet my needs or address situations in conversations?", Novice Low (PDF page 21): function "I can express some basic needs", context "related to very familiar activities with the help of gestures, facial expressions, or visuals", text type "using practiced or memorized words and phrases" (outcome 5).
  - Same page, Novice Mid: function "I can express and ask about needs"; example "I can ask and understand how much something costs." (outcome 4, and asking prices in lessons 3 to 5, a stretch for some children).

    - Interpersonal, Novice Low (PDF page 19): "I can provide information by answering a few simple questions"; example "I can respond to a basic math question using numbers." (outcomes 3 and 4).
    - Presentational, Novice Low (PDF page 23): function "I can name", context "very familiar people, places, and objects with the help of gestures, facial expressions, or visuals"; example "I can say numbers from 1-10." (food words in lesson 1; the numbers in this unit go beyond this example).
    - Interpretive, fictional texts, Novice Low (PDF page 14): "I can identify memorized or familiar words in short, straightforward fictional texts and media that are supported by gestures, facial expressions, or visuals" (the story in lesson 4).
- Wikipedia, "Total physical response": https://en.wikipedia.org/wiki/Total_physical_response . As in earlier units: commands answered with actions, listening before speaking, low stress (lessons 1 and 2).
- Wikipedia, "Information gap task": https://en.wikipedia.org/wiki/Information_gap_task (read 9 November 2026). Learners are missing information and must communicate to fill the gap. The pair game in lesson 5 is an information gap: each partner knows only half the prices.

Known gaps and cautions

- Three other agents text-checked this unit at 066df5e on 2026-11-12. Gemini 3.8 Flash and Gemini 4 Argon reported no errors. Gemini 4 Carbon found three materials gaps in lessons 3 and 4 (cards and coins used in the steps but missing from the lesson materials lists); these were fixed in d4cf1b2, and Gemini 4 Carbon and Gemini 4 Argon re-checked the fixes the same day. Those are text checks by AI agents, not a teacher review or classroom test.
- **No pronunciation help**, as in earlier units. Use a fluent speaker's recording if needed.
- **Numbers differ a lot between languages** (see the number warning). This unit cannot say how your language builds the teens and tens. Check with a fluent speaker; some classes will need more time on numbers than this unit gives.
- **Numbers between the tens** (like 25 or 63) are not taught; every price is a tens number, and every coin is worth ten. This is the author's choice to keep the shop simple. The year plan says "numbers to 100": this unit covers eleven to twenty and the tens to one hundred, not every number to 100. Tens-and-ones numbers are a stretch in lesson 3.
- **Word choices, prices and the story are the author's.** The Can-Do Statements describe what learners can do; they do not list words, prices or stories for a grade 3 class. The example "I can say numbers from 1-10" is a Novice Low example; it does not say which numbers a grade 3 class should learn.
- **Money and food are sensitive topics.** The unit uses pretend coins, picture food and story characters only (see Privacy and money). Check the whole unit against your school's policies on money and food in class.
- Timings are untested.

The lesson order matters: children meet the food words (lesson 1) and numbers (lessons 2 and 3) before they hear them together in prices; they hear the story (lesson 4) before they shop in groups; and the pair game and check come last (lesson 5).

Lesson 1: Food at the market

Unit overview - Next: Lesson 2: Eleven to twenty

Goal: Children recognise fourteen food words (ten from grade 1 and four new: **[tomato]**, **[pear]**, **[fish]**, **[milk]**) by pointing to picture cards, and meet Hen's stall.

Length: about 30 minutes.

Materials

- The word card.
- The fourteen large food picture cards.
- The large price board (shown, but prices are not taught today).
- A cloth or sheet of paper big enough to cover a few cards (for "what's missing?").
- Tick and cross cards (one of each per child).
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile food cards or large toy food.

Steps

✎ Opening (3 min)

Greeting chant. Hold up five of the grade 1 food cards one at a time (apple, banana, bread, egg, cheese) and say each word; children point or say it with you.

Warm-up: the old words (7 min)

1. Stick the ten grade 1 food cards on the board. Say each word and point; children say it with you or point from their seats.
2. Play **"Show me"**: say **[Show me the carrot]**; children point to the card (or, if the cards are on desks, hold it up). Do all ten words in a mixed order.
3. Ask yes/no questions about single cards: hold up the rice and say **[Is it soup?]** Children show the cross card. **[Is it rice?]** Tick.

✎ Main activity: four new words and "what's missing?" (12 min)

1. **New words (4 min).** Show **[tomato]**, **[pear]**, **[fish]** and **[milk]** one at a time. Say each word three times, with the card; children listen the first time, then join in or point. Add them to the board.
2. **Hen's stall (2 min).** Show the price board. Say, in the school language: "This is Hen's stall at the Little Hill market. Hen sells ten of these foods." Point to each food on the board and say its name; children point to the matching card on the board. Say that the numbers are prices, and the class will learn them soon.
3. **What's missing? (6 min).** Leave six cards on the board. Children close their eyes (or turn away); cover or take away one card. Children open their eyes; ask **[What is missing?]** in the language, or in the school language. Children say the word, or point

to where it was and the teacher says it. Play several rounds; let a child take a card away if they want to.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Which new food words did we learn today?" (Tomato, pear, fish, milk.)
- "Which foods on Hen's board did we already know from grade 1?" (Apple, carrot, banana, egg, bread, cheese.)

✓ Closing check (with answers) (5 min)

Hold up cards one at a time. Children show tick or cross:

1. Hold up the fish: **[Is it fish?]**
2. Hold up the pear: **[Is it a tomato?]**
3. Hold up the milk: **[Is it milk?]**
4. Hold up the tomato: **[Is it a pear?]**

Answers: tick; cross (it is a pear); tick; cross (it is a tomato).

Vocabulary

New: **[tomato]**, **[pear]**, **[fish]**, **[milk]**. Review: **[apple]**, **[banana]**, **[orange]**, **[grapes]**, **[carrot]**, **[bread]**, **[rice]**, **[egg]**, **[cheese]**, **[soup]**, **[Show me the ___]**, **[Is it ___?]**, **[yes]**, **[no]**.

Differentiation

- **Support:** play "what's missing?" with only four cards; children point to the gap instead of naming.
- **Stretch:** children take turns being the teacher: they say **[Show me the ___]** to the class.
- **Blind or low-vision children:** use tactile food cards or large toy food on their desk; for "what's missing?", a partner takes one away and the child feels which is gone.

⚠ Safety

- Picture cards (or large toy food) only; no real food, because of allergies.

Teacher notes and misconceptions

- "What is missing?" is a phrase for the teacher; children are not expected to say it. They only need to name or point.
- Some languages need "a" or "an" before a food word, or none, or a different word for things you can count (a pear) and things you cannot (milk). Say it the way the language says it.

- Do not ask children which foods they eat at home or like; that was the grade 1 unit, and this unit is about Hen's stall.

Lesson 2: Eleven to twenty

Unit overview - Previous: Lesson 1: Food at the market - Next: Lesson 3: Tens and prices

Goal: Children count on from **[ten]** to **[twenty]** and show a number from **[eleven]** to **[twenty]** when it is said, using the ten card and dot cards or number cards.

Length: about 30 minutes.

Materials

- The word card.
- The ten card and the kindergarten dot cards 1 to 10 (large).
- Large number cards 11 to 20.
- Small number cards 11 to 20, one set per pair.
- The fourteen large food picture cards (for the opening).
- Tick and cross cards (one of each per child).
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: the tactile ten card, and dot cards with raised dots.

Steps

✎ Opening (3 min)

Greeting chant. Show five food cards (tomato, pear, fish, milk, apple) and say **[Show me the ___]** for each in a mixed order; children point.

Warm-up: one to ten (7 min)

1. Count **[one]** to **[ten]** together, with fingers or claps, as in kindergarten.
2. Hold up dot cards in a mixed order; children say the number or show it on their fingers.
3. Hold up the ten card. Count its dots together: there are ten. Say **[ten]**.

✎ Main activity: eleven to twenty (12 min)

1. **Ten and some more (5 min).** Put the ten card on the board. Put the 1 dot card next to it and say **[eleven]**, holding up the 11 number card. Swap in the 2 dot card: **[twelve]**, with the 12 card. Go on to the 10 dot card: **[twenty]**. Children say the numbers with you or point. Then count from **[ten]** to **[twenty]** together, pointing at the cards.
2. **Show me (3 min).** Say a number from **[eleven]** to **[twenty]**. Children point to the large number card on the board. Do six numbers in a mixed order.
3. **Pair game: find it (4 min).** Each pair spreads its small number cards 11 to 20 face up. The teacher says a number; the first partner to touch the card holds it up, then puts it back. After four rounds, partners take turns saying a number for each other (in the language, or by holding up the ten card and a number of fingers).

✓ Discussion questions (with answers) (3 min)

In the school language:

- "How many dots are on the ten card?" (Ten.)
- "To show fifteen, which dot card goes next to the ten card?" (The 5 dot card.)
- "Do the words for eleven to twenty sound like ten and one, ten and two...? Or are they different?" (Depends on the language; listen to the word card together and decide.)

✓ Closing check (with answers) (5 min)

Show the ten card with a dot card beside it. Children hold up the matching small number card (or point to the large one):

1. Ten card and the 3 dot card.
2. Ten card and the 7 dot card.
3. Ten card and the 10 dot card.

Then say **[sixteen]**; children hold up the card.

Answers: 13 (**[thirteen]**); 17 (**[seventeen]**); 20 (**[twenty]**); 16.

Vocabulary

New: **[eleven]**, **[twelve]**, **[thirteen]**, **[fourteen]**, **[fifteen]**, **[sixteen]**, **[seventeen]**, **[eighteen]**, **[nineteen]**, **[twenty]**. Review: **[one]** to **[ten]**, **[Show me the ___]**, food words.

Differentiation

- **Support:** work only with eleven to fifteen; the child points to the number card while the teacher says it with them.
- **Stretch:** counting back from **[twenty]** to **[ten]**; or the child says the number and the partner builds it with the ten card and a dot card.
- **Blind or low-vision children:** use the tactile ten card and raised-dot cards; count the dots by touch.

⚠ Safety

- Nothing special; cards only.

Teacher notes and misconceptions

- Read the number warning on the unit overview page first. If your language says the ones before the ten (or has special words for the teens), the ten card and dot card still work: point to them in the order the language says them.
- If the language's word for "ten" changes inside the teens (as English "ten" becomes "-teen"), point that out once, lightly, and move on.

- Some children write 12 as 21 if the language says "two-ten". Accept the spoken or pointed answer; the written numeral is a maths skill and is not checked here.

Lesson 3: Tens and prices

Unit overview - Previous: Lesson 2: Eleven to twenty - Next: Lesson 4: Bear at the Market

Goal: Children count paper coins in tens to **[one hundred]** and answer **[How much is the ___?]** from Hen's price board.

Length: about 30 minutes.

Materials

- The word card.
- The large price board.
- Large number cards: the tens 10, 20, 30, 40, 50, 60, 70, 80, 90, 100.
- Large number cards 11 to 20 from lesson 2 (for the opening count).
- Ten large paper coins (each marked "10") for the teacher.
- Ten paper coins per pair.
- Small number cards per pair: the ten tens (the 11 to 20 cards are put away today).
- The 5 dot card from kindergarten (for the stretch task only).
- Tick and cross cards (one of each per child).
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile coins and a small copy of the price board.

Steps

✎ Opening (3 min)

Greeting chant. Count from **[ten]** to **[twenty]** together, pointing at the large 11 to 20 number cards from lesson 2.

Warm-up: counting coins in tens (7 min)

1. Hold up one large coin: "This coin is worth ten." Say **[ten]** and show the 10 card.
2. Add a second coin: **[twenty]**, with the 20 card. Add coins one at a time up to ten coins: **[thirty]**, **[forty]** ... **[one hundred]**. Children say the numbers with you, or hold up a finger for each coin.
3. Count all ten coins again together, faster: **[ten, twenty, thirty ... one hundred]**.

✎ Main activity: tens and prices (12 min)

1. **Show me the coins (4 min).** In pairs, with ten paper coins. Say a tens number; pairs count out that many coins (for **[sixty]**, six coins) and hold up the matching small tens card. Check the answer by counting the coins aloud together. Do five numbers in a mixed order.
2. **How much is it? (4 min).** Point to the price board. Point to the apple and say **[How much is the apple?]** then answer **[Ten coins]**, pointing to the price and holding up one coin. Do the same for the pear (**[Thirty coins]**) and the fish (**[One hundred coins]**).

3. **The class answers (4 min).** Ask **[How much is the ___?]** for five more foods in a mixed order. Children answer by holding up the small tens card, counting out coins, or saying **[___ coins]**. Then let volunteers ask the question while pointing at a food; the class answers.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "How many coins do we need for seventy?" (Seven coins, because each coin is worth ten.)
- "Which food on Hen's board costs the most?" (The fish, one hundred coins.) "Which costs the least?" (The apple, ten coins.)

✓ Closing check (with answers) (5 min)

Children answer from the price board with a small tens card, coins, or words:

1. **[How much is the egg?]**
2. **[How much is the bread?]**
3. **[How much is the carrot?]**
4. Hold up four coins: **[Is it forty?]**

Answers: fifty coins (5 coins); seventy coins (7 coins); twenty coins (2 coins); yes (tick).

Vocabulary

New: **[ten]**, **[twenty]**, **[thirty]**, **[forty]**, **[fifty]**, **[sixty]**, **[seventy]**, **[eighty]**, **[ninety]**, **[one hundred]** (as tens), **[coins]**, **[How much is the ___?]**, **[___ coins]**. Review: food words, **[eleven]** to **[twenty]**.

Differentiation

- **Support:** use only the first five prices (apple to egg, ten to fifty); the child counts coins one at a time with the teacher saying the tens.
- **Stretch:** tens and ones: the teacher says a number such as **[twenty-five]** the way the language says it, and the child shows it with two coins and the 5 dot card. (This is beyond the unit's outcomes and is not checked.)
- **Blind or low-vision children:** count tactile coins by touch; use their own small price board.

⚠ Safety

- Paper coins only; no real or toy money.

Teacher notes and misconceptions

- The point of "one coin = ten" is that children can find any price on the board by counting coins, even before they are sure of the tens words.
- Some children say "seven coins" when asked the price of the bread. That is a correct count of coins; say with them **[seventy coins]** and move on.
- Read the number warning on the unit overview page: in some languages the tens are not all built the same way (for example, a word for seventy that sounds like "sixty-ten"). Teach them as the language says them; do not explain why.
- Never ask children what things cost in their own shops or what their family pays.

Lesson 4: Bear at the Market

Unit overview - Previous: Lesson 3: Tens and prices - Next: Lesson 5: Our price list (pair game)

Goal: Children follow the picture story "Bear at the Market", understand **[I would like the ___, please]** and **[Here you are]**, and buy and sell picture-card food in a pretend shop.

Length: about 30 minutes.

Materials

- The word card.
- The six large story picture cards (see the unit overview).
- The large price board.
- Ten large paper coins for the opening count (five of them are Bear's coins in the story), the large pear card and the large cheese card.
- **A pretend shop per group of three or four:** the ten stall food cards (small: apple, carrot, pear, banana, egg, tomato, bread, milk, cheese, fish), a small copy of the price board, ten paper coins, a tray or lidless box for the stall, and six shopping cards, each showing one stall food (apple, carrot, pear, banana, egg, milk).
- Tick and cross cards (one of each per child).
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile coins, tactile food cards or large toy food, and a small copy of the price board.

Steps

✎ Opening (3 min)

Greeting chant. Count ten large coins together in tens: **[ten, twenty, thirty ... one hundred]**. Ask **[How much is the pear?]**; children answer from the price board (thirty coins).

Warm-up: the story (7 min)

1. **Tell it (4 min).** Show the six story cards one at a time and say each card's lines, with the gestures. Act Bear with the five large coins and the pear card: count Bear's coins aloud (**[ten, twenty, thirty, forty, fifty]**) on card 1, give three coins to "Hen" on card 5, and count the two left on card 6.
2. **Join in (3 min).** Tell it again; children join in with **[Oh no!]** on cards 2 and 3, and with **[Thank you!]** on card 5, by saying it or doing the gesture.

✎ Main activity: the pretend shop (12 min)

1. **Model it (2 min).** At the front, the teacher is the stallholder and a volunteer is the customer, with ten coins. The customer takes a shopping card (the carrot). The talk:
    - Customer: **[Hello!]** Stallholder: **[Hello!]**

    - Customer: **[How much is the carrot?]** (or points to the carrot with the "how much" gesture). Stallholder: **[Twenty coins.]**
    - Customer: **[I would like the carrot, please.]** (or points to the shopping card). Stallholder: **[Here you are.]** and hands over the carrot card.
    - Customer pays two coins. Stallholder: **[Thank you! Goodbye!]**

  Then the customer gives the carrot card and the two coins back to the stall, so the next customer has the full set. 2. **Groups shop (8 min).** Each group sets up its stall on a desk. Roles: **stallholder** (sells the food cards and gives prices), **customer** (has the ten coins, takes a shopping card face down, and buys that food), and **coin counter** (counts the coins aloud in tens and checks they match the price). A fourth child is a second customer who waits a turn. After each sale, the food card and coins go back, and roles move round the group. Every child has a turn in each role if they want; nobody has to speak. 3. **Tidy (2 min).** Each group puts its ten food cards, ten coins and six shopping cards back on the tray.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "In the story, why did Bear say 'Oh no!' at the cheese?" (Because the cheese cost ninety coins and Bear had only fifty.)
- "How many coins did Bear have left at the end?" (Two: Bear had five and paid three for the pear.)

✓ Closing check (with answers) (5 min)

Lay out the six story cards in order, numbered 1 to 6. Say a line from the story; children hold up fingers (or point) for the card:

1. **[Seventy coins.]**
2. **[Here you are.]**
3. **[I would like the pear, please.]**

Then hold up the cheese card: **[I would like the cheese, please. How much is it?]** Children answer from the price board.

Answers: card 3; card 5; card 4; ninety coins.

Vocabulary

New: **[I would like the ___, please]**, **[Here you are]**. Review: **[How much is the ___?]**, **[___ coins]**, the tens, food words, **[hello]**, **[goodbye]**, **[thank you]**, **[Oh no!]**, **[The end]**.

Differentiation

- **Support:** the child is the coin counter or the stallholder who hands over cards; the teacher or a partner says the words.

- **Stretch:** the customer buys two foods from one shopping round (for example, the apple and the egg: ten and fifty, so six coins), asking both prices first.
- **Blind or low-vision children:** use tactile coins and tactile food cards (or large toy food); the stallholder says the food name as they hand it over.

⚠ Safety

- Stalls stay on desks; children walk, not run. No real food or money.

Teacher notes and misconceptions

- Every shopping card costs one hundred coins or less, and every customer has ten coins (one hundred), so every customer can buy their food. Nobody runs out of money.
- Keep Bear's "Oh no!" light: Bear looks surprised, then chooses the pear and is happy. The story is about choosing, not about being poor. Do not ask children what they would do without enough money.
- "I would like" may be very polite or a little formal in your language. Use the phrase a fluent speaker would use at a market stall (see the grammar warning on the unit overview page).
- If a group finishes quickly, the stallholder can ask the customer a closing question: **[How much is the ___?]** for any food on the board.

Lesson 5: Our price list (pair game)

Unit overview - Previous: Lesson 4: Bear at the Market

Goal: Children ask and answer **[How much is the ___?]** in an information-gap pair game about a second stall, and the teacher starts the one-to-one check.

Length: about 30 minutes (the one-to-one check is spread over the week).

Materials

- The word card.
- The large price board (Hen's stall), for the opening; then turned round or covered.
- **Price-list sheets per pair** for **Goat's stall**, a different stall at the same market with different prices:
  - **Sheet A:** all ten stall foods in a list, with five prices filled in: apple 20, pear 40, egg 60, bread 80, cheese 100. The carrot, banana, tomato, milk and fish have an empty price box.
  - **Sheet B:** the same list, with the other five prices filled in: carrot 10, banana 30, tomato 50, milk 70, fish 90. The apple, pear, egg, bread and cheese have an empty price box.
- A folder or book per pair to stand up as a screen.
- A pencil per child.
- Ten paper coins per pair.
- A large copy of Goat's full price list (all ten prices), kept hidden until the closing check.
- Tick and cross cards (one of each per child).
- **Check things** (see the Assessment section of the unit overview): eight small food cards (apple, carrot, pear, banana, bread, fish, tomato, milk), small number cards 11 to 20 and the ten tens, ten paper coins, the ten card and dot cards, the small price board (Hen's), and the record sheet (class list with five columns).
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile coins, and large-print copies of the sheets (see Differentiation).

Steps

✎ Opening (3 min)

Greeting chant. Ask two prices from Hen's board: **[How much is the tomato?]** (sixty coins) and **[How much is the milk?]** (eighty coins). Then turn the board round or cover it.

Warm-up: Goat's stall (7 min)

1. In the school language: "Goat has a stall at the market too. Goat sells the same foods, but Goat's prices are different. Each of you knows only half of Goat's prices."
2. Show a sheet A and point out the filled-in prices and the empty boxes. Say: "To fill the empty boxes, you ask your partner."

3. **Model it (3 min).** With a volunteer who has sheet B behind a screen, the teacher (with sheet A) points to the carrot and asks **[How much is the carrot?]** The volunteer answers **[Ten coins]** (or holds up one coin, or shows the tens with fingers). The teacher writes 10 in the carrot's empty box.

✎ Main activity: the pair game (12 min)

1. **Ask and fill (8 min).** Partners sit with a screen between them. Child A asks about each food with an empty box on sheet A; child B answers from sheet B and A writes the number. Then they swap: B asks about B's empty boxes and A answers. Answers can be words, coins counted out (one coin for each ten), or fingers.
2. **Compare (2 min).** Partners take the screen away and put their sheets side by side. Every food should now have the same price on both sheets. Fix any that are different by asking again.
3. **Shop at Goat's stall (2 min).** With the ten paper coins, partners take turns: one points to a food and says **[I would like the ___, please]**; the other says the price from the sheet, and the first counts out the coins.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Why did you need to ask your partner?" (Because only your partner knew those prices.)
- "Is the pear cheaper at Hen's stall or at Goat's stall?" (Hen's: thirty coins; Goat's is forty.)

✓ Closing check (with answers) (5 min)

Show the large copy of Goat's full price list. Children answer with fingers, coins, a tick or cross, or words:

1. **[How much is the banana?]**
2. **[How much is the fish?]**
3. Point to the cheese: **[Is it ninety coins?]**

Answers: thirty coins; ninety coins; no (cross), it is one hundred coins.

One-to-one check (over the week)

While the class plays the lesson 3 coin game or the lesson 4 pretend shop again, do the five-part check in the unit overview with each child (about 3 minutes each). Use Hen's small price board for part 4, not Goat's list.

Vocabulary

Review: **[How much is the ___?]**, **[___ coins]**, **[I would like the ___, please]**, the tens, food words, **[yes]**, **[no]**.

Differentiation

- **Support:** the child fills only two or three empty boxes; the partner may point to the number on their sheet after saying it.
- **Stretch:** the child asks a whole question and answers with a whole sentence each time; or the pair makes up a third stall with new tens prices and plays again.
- **Blind or low-vision children:** the partner reads each price aloud and the child records it by putting that many tactile coins on the food's line of the sheet, instead of writing; large-print sheets for low-vision children.

⚠ Safety

- Pencils are used at desks and collected at the end.

Teacher notes and misconceptions

- This is an information gap: each partner really needs the other's prices. Do not let children look over the screen, and keep Hen's board covered, because Goat's prices are different.
- Writing a numeral such as 70 is a maths skill, not the language skill being practised. Children may draw seven coins, or put seven coins on the box, instead.
- Some children answer with the coin count (**[seven]**) instead of the price (**[seventy]**). Accept it in the game; say **[seventy coins]** with them.
- Goat's prices are made up by the author, like Hen's, and are not meant to be realistic.

Grade 3 Second Language: Weather and Seasons (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 12 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check it against your school's rules before use. All places, calendars and weather in this unit belong to the made-up town of Little Hill. Children are never asked about their birthdays, holidays, trips, homes or what their families do in any month or season.
>
> Text-checked by four other agents (Gemini 3.5 Flash, Gemini 3.8 Flash, Gemini 4 Carbon and Gemini 4 Argon); see Known gaps.

Back to the grade 3 year plan - Term 2. Builds on grade 3 term 1: The Market, grade 1 term 2: Weather, Clothes and Days of the Week, and the grade 3 science unit Weather Over a Season.

In grade 1 children learned six weather words, **[What's the weather?]** and the days of the week; in grade 3 term 1 they counted to twenty and played an information-gap pair game. This unit adds five new weather words (**[snowy]**, **[foggy]**, **[stormy]**, **[warm]**, **[cool]**), the four seasons, the twelve months, the questions **[What is the weather like?]**, **[What is the weather like in ___?]**, **[What season is it?]** and **[What month is it?]**, and two sentence starters for describing a picture: **[This is ___]** and **[I see ___]**. At the end, children describe a picture of Little Hill in up to three short sentences.

Which language?

This unit works with any language the school teaches. Before lesson 1, fill in the **word card** below. In the lessons, words in square brackets, like **[It is foggy]**, mean "say this in the language you are teaching".

English meaning	Your language	Gesture or picture to go with it
(review from grade 1) sunny, rainy, cloudy, windy, hot, cold		weather picture cards; the grade 1 actions (below)
snowy, foggy, stormy, warm, cool (new)		weather picture cards; new actions (below)
winter, spring, summer, autumn		the four Little Hill season pictures; season actions (below)
January, February, March, April, May, June, July, August, September, October, November, December		the twelve month cards (word and number)
Is it ___? / yes / no		questioning face and open hands; nod or shake the head
What is the weather like? / It is ___		hand flat over eyes, looking out; then the weather card
What is the weather like in ___? / In ___ it is ___		the month card, then hand over eyes, then the weather card
What season is it? / It is ___		

English meaning	Your language	Gesture or picture to go with it
		both hands draw a big circle (the year), then the season action
What month is it? / It is ___		finger taps the month card
This is ___		open hand towards the picture
I see ___		point to your eye, then to the thing in the picture
tree, flowers, leaves, snow, sun, clouds		the six small "I see" cards (pictures only)
(said by the teacher only, in lesson 5 and the check) Tell me about the picture / What do you see?		point to the picture; point to your eye, then the picture
(review from grade 1) Put on ___		miming pulling the item on
(review) days of the week, clothes words, one to twenty, yes, no, please, thank you		as in earlier units

Weather actions. Use the grade 1 actions for the six review words: sunny = arms make a big circle above the head; rainy = fingers wiggle downwards; cloudy = arms make a puffy shape; windy = sway like a tree; hot = fan your face; cold = hug yourself and shiver. New actions (the author's choice; keep them the same every time):

- **snowy** = both hands float down slowly, palms down, like flakes drifting (slower and softer than rainy);
- **foggy** = one hand moves slowly across in front of the eyes, as if looking through mist;
- **stormy** = one finger draws a quick zigzag in the air (lightning); no stamping or banging;
- **warm** = rub the hands together, then hold the palms out and smile;
- **cool** = one hand lightly rubs the other arm once (a small shiver, smaller than cold).

Season actions (the author's choice): **winter** = make a snowball with both hands; **spring** = closed fingers open slowly like a flower; **summer** = wipe your forehead; **autumn** = fingers flutter down like falling leaves.

Weather card pictures: draw each card with a clear shape, not colour alone. Hot, warm, cool and cold all show a **thermometer** with the level at four clearly different heights (hot near the top, warm above the middle, cool below the middle, cold near the bottom), plus a small figure: hot fanning their face, warm in a T-shirt, cool in a light jacket, cold in a coat and scarf. Snowy shows six-pointed flakes; foggy shows three wavy lines across a faint tree; stormy shows a dark cloud with a zigzag; windy shows curved lines and a bending tree.

Grammar warning: languages say weather in very different ways (for example "it is sunny", "it makes sun", "there is sun", or one word), and some use different forms for "it is warm (weather)" and "I am warm (my body)". Use the weather form. Some languages put **[in]** before months and seasons; some use a different word, or none. "I see" may need a different form of the noun after it (for example a plural or an object form): say **[I see leaves]** the way a fluent speaker would. Children only need to **understand** the phrases and **show** their answers; saying them is invited, never required.

Season warning: seasons are not the same everywhere. North and south of the equator have opposite seasons (summer in July in one, in January in the other), and many tropical places have a **rainy season** and a **dry season** rather than four. Some cultures name more seasons, or different ones; the word for autumn may also be "fall". Little Hill is a made-up town with four

seasons, so the whole class can share the same pictures. If you live somewhere with different seasons, you may also teach your local season words as an extra, but do not change Little Hill: keep its pictures and calendar the same everywhere in the unit.

Calendar warning: this unit uses the twelve months of the Gregorian calendar, the calendar most schools use for the school year. Some languages name months by number (like "month one"), and some communities also use other calendars. Say the months the way the language really says them.

The Little Hill picture calendar

Lesson 4, the closing check and the one-to-one check use the same **picture calendar** for Little Hill. Each month's page shows one picture of one kind of weather. It is a calendar picture, not a weather record: real weather changes from day to day (see the science unit Weather Over a Season). Made up by the author; free to change, but change it everywhere.

Month	Picture on the calendar	Season in Little Hill
1 January	snowy	winter
2 February	cold	winter
3 March	windy	spring
4 April	rainy	spring
5 May	warm	spring
6 June	sunny	summer
7 July	hot	summer
8 August	stormy	summer
9 September	cool	autumn
10 October	foggy	autumn
11 November	cloudy	autumn
12 December	snowy	winter

All eleven weather words appear; snowy appears twice. **Keep this table away from the children until the end of lesson 4**: in the lesson 4 pair game each partner knows only half of it.

The four Little Hill season pictures

Four large pictures of the **same view** of Little Hill: the hill, one big tree, the river and the bridge. Draw them simply; any style is fine. Each picture has one clear kind of weather and one clear thing to see, so the describing game in lesson 5 has a fair answer:

Season	Weather in the picture	Things to see
Winter	snowy (flakes falling)	snow on the ground and on the bridge; the tree has no leaves; clouds
Spring	rainy (rain falling)	flowers in the grass; small new leaves on the tree; clouds
Summer	sunny (a big sun, no clouds)	the sun; the tree full of leaves; flowers
Autumn	foggy (wavy lines of fog over the river)	leaves falling from the tree and on the ground

Model descriptions (answers for lesson 5): **[This is Little Hill. It is winter. It is snowy. I see snow.]**; **[This is Little Hill. It is spring. It is rainy. I see flowers.]**; **[This is Little Hill. It is summer. It is sunny. I see the sun.]**; **[This is Little Hill. It is autumn. It is foggy. I see leaves.]** Other true sentences also count (for example **[I see a tree]** for any picture, or **[It is hot]** for summer).

Big idea

We can **talk about the weather and the time of year** in a new language: name the weather, the seasons and the months, ask what the weather is like, and **describe a picture of a place** in a few short sentences.

Outcomes

By the end of the unit, most children can:

1. Show the eleven weather words (six review words and five new ones) when they are said, by pointing to the card, doing the action or saying the word.
2. Point to the right Little Hill season picture when a season word is said, and show a season with its action or word.
3. Follow or join in the months chant in order, and point to the right month card when a month is said.
4. Answer **[What is the weather like in ___?]** from the Little Hill picture calendar, and in the pair game ask about a month (in words, or by showing the month card with the question gesture).
5. Describe one Little Hill season picture in up to three short pieces (the season, the weather, one thing they see), in words, signs, actions or by placing cards.

Prior knowledge

- Weather, Clothes and Days of the Week (grade 1 term 2): **[sunny]**, **[rainy]**, **[cloudy]**, **[windy]**, **[hot]**, **[cold]** with actions; **[What's the weather?]**; the clothes words and the paper Bear; the days of the week.
- The Market (grade 3 term 1): the numbers **[eleven]** to **[twenty]**; an information-gap pair game with a screen.
- Grade 3 science, Weather Over a Season: the four seasons in Little Hill and the idea that weather changes from day to day. It helps, but it is **not** needed here.
- Children who missed earlier units can still take part; every word has a card, a picture or an action.

Lessons

Keep the 1-minute greeting chant at the start of each day. From lesson 3, add one line to it: **[What month is it?] [It is ___]** with the month card for the real month.

Lesson	Title	Time	Core idea
1	Eleven kinds of weather	30 min	Six review weather words and five new ones, with actions and a "dress Bear for the weather" game
2	Four seasons in Little Hill	30 min	The season words with four pictures of the same place; **[This is ___]** and **[I see ___]**

Lesson	Title	Time	Core idea
3	Twelve months	30 min	The months chant, month cards in order, and the months of each Little Hill season
4	The Little Hill calendar (pair game)	30 min	An information-gap pair game: **[What is the weather like in ___?]**
5	Guess my picture	30 min	Describing a season picture in up to three sentences, a guessing game in pairs, and the one-to-one check

Timings: every lesson is 30 minutes (3 + 7 + 12 + 3 + 5; in lesson 5 the one-to-one check is spread over the week).

Materials

Whole class unless noted.

- The filled-in word card (above), kept where the teacher can see it.
- **Eleven large weather cards:** sunny, rainy, cloudy, windy, hot, cold (from grade 1, or new copies) and snowy, foggy, stormy, warm, cool (new). Big enough to see from the back of the room.
- **The paper Bear and paper clothes** from the grade 1 unit (hat, coat, scarf, gloves, boots, T-shirt, shorts, umbrella), for lesson 1. Make new ones if they are lost.
- **The four large Little Hill season pictures** (above).
- **Twelve large month cards:** each shows the month name written in the language and its number (1 to 12) in large numerals. No weather pictures on them.
- **A string or long strip of card** on the wall, long enough to hang or stick the twelve month cards in a row (lesson 3), and something to fix them with (pegs, clips or reusable sticky putty).
- **The large Little Hill picture calendar** (above): a poster with twelve boxes, one per month, each with the month number, the month name and the weather picture. Kept hidden until the closing check of lesson 4.
- **Small weather cards per pair** (lessons 1 and 4): the eleven weather cards, small enough to lay out on a desk.
- **Small month cards per pair** (lesson 3): the twelve months, word and number.
- **Four small season pictures per pair** (lessons 2 and 3) and **per child** (lesson 5: two sets per pair): copies of the four large pictures.
- **Six small "I see" cards per pair** (lessons 2 and 5): tree, flowers, leaves, snow, sun, clouds (pictures only, no words).
- **Calendar sheets per pair** (lesson 4): sheet A and sheet B (see lesson 4), a folder or book to stand up as a screen, and a pencil per child.
- **Tick and cross cards:** one of each per child, as in earlier units.
- **Check things** (lesson 5): eight small weather cards (snowy, foggy, stormy, cool, sunny, rainy, windy, warm), the four small season pictures, six small month cards (January, March, May, July, October, December), the large picture calendar, the six small "I see" cards, and the record sheet (class list with five columns).
- Ear defenders and a quiet spot, as in every unit.
- Optional, for blind or low-vision children: **tactile weather cards** (raised shapes: a circle with rays for sunny, raised dots falling for rainy, a soft felt cloud for cloudy, a raised zigzag for stormy, three straight raised lines across for foggy, curved raised lines ending in a curl for windy, raised six-pointed stars for snowy, and a raised thermometer with a bead at four heights for hot, warm, cool and cold), **tactile month cards** (the number in large raised

numerals or braille, if the child reads braille), a **tactile season set** (a felt snowflake, a felt flower, a felt sun, a felt leaf; two sets for lesson 5), **paper clothes cut from different textures** for the paper Bear (for example a felt hat, a paper T-shirt, a foil umbrella; lesson 1), and large-print copies of the lesson 4 sheets.
- Optional: a fluent speaker's recording of the word card, the months and the model descriptions.

⚠ Safety and access

Safety

- Children walk, not run, when they come to the front to place cards or line up; the months line in lesson 3 has a seated version.
- Pencils are used at desks and collected at the end.
- No real weather activity is needed: nobody goes outside in bad weather for this unit, and nothing is wet, cold or hot.

Privacy and feelings

- **Never ask** children about their birthdays, holidays, festivals, trips, homes or what their families do in any month or season. Months and seasons are always about Little Hill or the school calendar on the wall.
- **Stormy weather can frighten some children**, and some may have lived through a storm, flood or fire. Present **[stormy]** calmly, with a quiet zigzag, not thunder noises. If a child becomes upset or talks about a real storm, listen kindly, let them sit out the action, and follow the school's usual steps for passing on a concern.
- Some children may feel left out if the class seasons do not match their own experience (for example a child who has lived somewhere with a rainy and a dry season). Welcome it: "In some places there are different seasons. Little Hill has these four."

Taking part

- **Speaking and acting are optional.** Pointing, placing cards, doing the actions, holding up month cards and signs all count. Never make a child speak or act alone in front of others.
- **Movement:** every action has a seated version (hands only). Children can place month cards from their seats, or hand them to a helper, instead of lining up.
- **Children new to the school language:** keep actions identical every time and accept answers in any language.
- **Noise:** quiet spot and ear defenders allowed; in whole-class games children answer with cards or actions, not shouting.

Seeing, hearing and colour

- **Colour vision:** weather cards use shapes (flakes, zigzags, a thermometer level), and season pictures differ by snow, flowers, sun and falling leaves, so nothing is known only by colour. If a child mixes up only colours, do not record it as a language gap.
- **Blind children:** use the tactile weather cards, tactile month cards and the tactile season set. Keep the check things in fixed places and tell the child where each one is before asking. In lesson 5 the partner describes; the blind child finds the matching tactile season item. A description given in words, signs or by handing over tactile items is a full answer.

- **Low-vision children:** large, high-contrast cards; seat them near the month line and the season pictures, or give them their own small copies.
- **Deaf or hard-of-hearing children:** keep your face visible; do the action or show the card every time you say the word.
- **If the language is a sign language:** signs for weather and seasons often look like the thing they mean (falling snow, the sun). That is the language, and it is fine. In the check, if a sign shows its answer, ask the child to **point to** the card or picture instead, so the sign itself does not give the answer away.

Assessment

Lesson 5 includes a five-part check, done one-to-one (about 3 minutes each child; spread over the week). Ask everything with no action and without pointing or looking at the answer. Record each part as **yes**, **with help** or **not yet**:

1. **Weather words:** lay out the eight small weather cards (snowy, foggy, stormy, cool, sunny, rainy, windy, warm), shuffled. Say **[snowy]**, **[foggy]**, **[stormy]** and **[cool]**; the child points to each, or does its action. Yes = four of four.
2. **Seasons:** lay out the four small season pictures, shuffled. Say **[summer]**, **[winter]**, **[autumn]** and **[spring]**; the child points to each. Yes = four of four.
3. **Months:** lay out the six small month cards (January, March, May, July, October, December), shuffled. Say **[March]**, **[July]** and **[October]**; the child points to each card. The child may say the months chant quietly or count on their fingers to find it. Yes = three of three.
4. **What is the weather like?:** show the large Little Hill picture calendar. Ask **[What is the weather like in July?]** (hot) and **[What is the weather like in October?]** (foggy). The child may point to the picture on the calendar, do the action, point to the small weather card, or say it. Yes = both.
5. **Describe a picture:** put the summer picture in front of the child, with the six small "I see" cards beside it. Say **[Tell me about the picture]** (or the school-language words, if the child needs them), then, if needed, ask **[What season is it?]**, **[What is the weather like?]** and **[What do you see?]**. The child answers in words, signs, actions (the season action, the weather action) or by putting an "I see" card on the picture. Answers: summer; sunny (hot also counts); the sun, a tree, leaves or flowers. Yes = all three pieces, with or without the three questions.

Doing it in their own way (pointing, signs, actions, the child's usual access) counts as **yes**. "Not yet" is normal for some children; the games can be played again any time. Asking about a month in the lesson 4 game (part of outcome 4) is **not** recorded: notice it, but do not score it.

Sources

- NCSSFL-ACTFL Can-Do Statements, Novice: https://www.actfl.org/uploads/files/general/Resources-Publications/Can-Do-Novice.pdf (read 12 November 2026; the quoted lines and their sublevels were checked against the rendered PDF pages). These are performance indicators and examples, not a curriculum, and the unit is not a full alignment. Lines used for this unit, quoted exactly:
  - Interpretive, informational texts, Novice Mid (PDF page 15): function "I can identify some basic facts", context "in short, straightforward informational texts and media that are supported by gestures, facial expressions, or visuals", text type "from

memorized or familiar words and phrases"; spoken, viewed, or signed example "I can recognize some weather expressions in a forecast." (lessons 1 and 4; outcome 4).
    - Same page, Novice High, written example: "I can understand some facts about the weather especially when weather symbols are used." (the weather symbols on the lesson 4 sheets; a stretch).
    - Interpretive, observed conversations and discussions, Novice Mid (PDF page 17), spoken, viewed, or signed example: "I can recognize some common expressions when people are discussing the weather." (outcome 1).
    - Interpersonal, Novice Low (PDF page 19): "I can provide information by answering a few simple questions" (outcomes 2 to 4).
    - Presentational, Novice Low (PDF page 23): function "I can name", context "very familiar people, places, and objects with the help of gestures, facial expressions, or visuals"; speaking or signing example "I can say the date and the day of the week." (the months and the daily greeting line from lesson 3; this unit does not teach dates); writing example "I can label familiar people, places, and objects in pictures and posters." (placing "I see" cards on pictures).
    - Same page, Novice Mid: function "I can share information", context "on both very familiar and everyday topics", text type "using a mix of practiced or memorized words, phrases, and simple sentences"; example "I can present simple information about my town or city." (outcome 5, describing a picture of Little Hill; Little Hill is a made-up town, not the child's own).
- Wikipedia, "Season": https://en.wikipedia.org/wiki/Season (read 12 November 2026). The Northern and Southern Hemispheres always have opposite seasons; temperate regions generally recognise four seasons, and many tropical regions have two, a rainy (wet) season and a dry season; the definition of seasons is also cultural. This is the reason for the season warning above.
- Wikipedia, "Total physical response": https://en.wikipedia.org/wiki/Total_physical_response . As in earlier units: commands answered with actions, listening before speaking, low stress (lessons 1 to 3).
- Wikipedia, "Information gap task": https://en.wikipedia.org/wiki/Information_gap_task (read 9 November 2026). Learners are missing information and must communicate to fill the gap. The pair game in lesson 4 is an information gap: each partner knows only half of the Little Hill picture calendar.

Known gaps and cautions

- Four other agents (Gemini 3.5 Flash and Gemini 3.8 Flash at 723c6bb; Gemini 4 Carbon at 723c6bb/e83f91b; Gemini 4 Argon at 7c5a9f7) text-checked this unit on 2026-11-12. None reported errors; Carbon suggested two word-card additions (**[Is it ___?]** and **[Put on ___]**), now added, with lesson 1 and lesson 5 wording matched to them. Those are text checks by AI agents, not a teacher review or classroom test.
- **No pronunciation help**, as in earlier units. Use a fluent speaker's recording if needed.
- **Seasons and months depend on where you live** (see the season warning). Little Hill's four seasons and picture calendar are the author's choice, made so the whole class shares one set of pictures; they are not "the right" seasons.
- **Twelve month words are a lot.** Most children will recognise them with the chant and the numbers before they can say them alone; that is all outcome 3 asks. Dates (like "the third of March") are not taught.
- **Word choices, the picture calendar, the pictures and the actions are the author's.** The Can-Do Statements describe what learners can do; they do not list words, seasons or

months for a grade 3 class. The example "I can say the date and the day of the week" is a Novice Low example; this unit covers months only, not dates.
- The year plan says "describing a picture of a place in a few sentences". This unit describes **one made-up place** (Little Hill) in **up to three short sentences** with set starters; describing other places freely is not taught.
- Timings are untested.

The lesson order matters: children meet the weather words (lesson 1) before the seasons (lesson 2), and the seasons before the months (lesson 3); they need both months and weather words for the calendar pair game (lesson 4); and describing a whole picture comes last (lesson 5).

Lesson 1: Eleven kinds of weather

Unit overview - Next: Lesson 2: Four seasons in Little Hill

Goal: Children review six weather words from grade 1, learn five new ones (**[snowy]**, **[foggy]**, **[stormy]**, **[warm]**, **[cool]**) with actions, and answer **[What is the weather like?]**.

Length: about 30 minutes.

Materials

- The word card.
- The eleven large weather cards: sunny, rainy, cloudy, windy, hot, cold, snowy, foggy, stormy, warm, cool.
- The paper Bear and the eight paper clothes from grade 1 (hat, coat, scarf, gloves, boots, T-shirt, shorts, umbrella), on a board or table at the front.
- Small weather cards per pair (all eleven).
- Tick and cross cards (one of each per child).
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile weather cards (see the unit overview), and paper clothes cut from different textures (see Differentiation).

Steps

✎ Opening (3 min)

Greeting chant. Hold up the sunny, rainy and cold cards one at a time and say each word; children do the grade 1 action (arms make a big circle; fingers wiggle downwards; hug yourself and shiver).

Warm-up: six weather words again (7 min)

1. **Actions (3 min).** Say each review word without showing the card: **[sunny]**, **[cloudy]**, **[windy]**, **[hot]**, **[rainy]**, **[cold]**. Children do the action. Then show the card so everyone can check.
2. **The question (4 min).** Hold one review card face down. Do the "looking out" gesture (hand flat over the eyes) and ask **[What is the weather like?]** Turn the card over. Children do the action; say **[It is ___]** with them (for example **[It is windy]**). Do this with four or five cards. Children who want to may say **[It is ___]** too.

✎ Main activity (12 min)

1. **Five new words (5 min).** Show each new card, say the word three times, and do its action (see the unit overview): **[snowy]** (hands float down slowly), **[foggy]** (one hand moves slowly across in front of the eyes), **[stormy]** (one finger draws a quick zigzag; quietly), **[warm]** (rub hands, palms out, smile), **[cool]** (one hand lightly rubs the other

arm once). Children copy the action each time. Then put two pairs side by side and point out the difference:
    - **rainy** and **snowy**: rain wiggles down fast; snow floats down slowly.
    - **hot, warm, cool, cold**: put the four cards in a row and point to the thermometer on each. "The line goes down: hot, warm, cool, cold."
2. **Weather actions game (4 min).** Pairs lay out their eleven small weather cards. Say a word (no card, no action); each pair points to the card, and children do the action. Then swap: do an action silently, and pairs point to the card. Mix review and new words; use each new word at least twice.
3. **Dress Bear for the weather (3 min).** Hold up a weather card and ask **[What is the weather like?]** Children answer with the action (or the word). Then ask a volunteer to choose one paper clothing item for Bear (or children point and the teacher moves it), and say **[Put on ___]** together. Do snowy, hot and rainy. More than one choice is fine (for snowy: coat, scarf, gloves, hat or boots; for hot: T-shirt, shorts or hat; for rainy: umbrella, coat or boots).

✓ Discussion questions (with answers) (3 min)

In the school language:

- "How are snowy and rainy different?" (Snow is frozen and floats down slowly; rain is water and falls faster.)
- "Which is colder, cool or cold?" (Cold. Cool is a little bit cold.)
- "What could Bear wear when it is foggy?" (Any sensible answer; a coat is a good one. There is no single right answer.)

✓ Closing check (with answers) (5 min)

Pairs use their small weather cards; every child also has a tick and a cross card.

1. Say **[foggy]**; pairs point to the card.
2. Say **[warm]**; pairs point to the card.
3. Do the stormy action silently; pairs point to the card.
4. Hold up the cool card and ask **[Is it cold?]**

Answers: the foggy card (wavy lines over a faint tree); the warm card (thermometer above the middle, figure in a T-shirt); the stormy card (dark cloud with a zigzag); no (cross), it is cool.

Vocabulary

New: **[snowy]**, **[foggy]**, **[stormy]**, **[warm]**, **[cool]**, **[What is the weather like?]**. Review: **[sunny]**, **[rainy]**, **[cloudy]**, **[windy]**, **[hot]**, **[cold]**, **[It is ___]**, **[Put on ___]**, the clothes words, **[yes]**, **[no]**.

Differentiation

- **Support:** the child works with six cards only (the six review words) at first, then adds snowy and stormy; hot, warm, cool and cold can come later.
- **Stretch:** the child answers **[What is the weather like?]** with a whole sentence, or chooses two clothes for Bear and says **[Put on ___ and ___]**, if the language joins things that way.
- **Blind or low-vision children:** use the tactile weather cards; the partner guides the child's hand along the row. In "dress Bear", the child chooses by touch from paper clothes cut from different textures (felt hat, paper T-shirt, foil umbrella).

⚠ Safety

- Children walk, not run, to the front to dress Bear; Bear can also be passed round the room.
- The stormy action is quiet: no stamping, banging or thunder noises.

Teacher notes and misconceptions

- Warm and cool are the hardest new words, because they are "in between". The thermometer on the cards helps: always show the four temperature cards in the same order.
- Some children confuse **[snowy]** (the weather) with **[snow]** (the thing). The thing comes in lesson 2 with the "I see" cards; for now, use only the weather word.
- In some languages the words for weather temperature and body temperature differ (see the grammar warning in the unit overview). Use the weather form here.
- If a child talks about a real storm and seems upset, see Privacy and feelings in the unit overview.

Lesson 2: Four seasons in Little Hill

Unit overview - Previous: Lesson 1: Eleven kinds of weather - Next: Lesson 3: Twelve months

Goal: Children learn the four season words with four pictures of the same place, answer **[What season is it?]**, and meet **[This is ___]** and **[I see ___]** with six picture words.

Length: about 30 minutes.

Materials

- The word card.
- The four large Little Hill season pictures (winter, spring, summer, autumn; see the unit overview), on the board in that order.
- The eleven large weather cards (from lesson 1).
- Four small season pictures per pair.
- Six small "I see" cards per pair: tree, flowers, leaves, snow, sun, clouds (pictures only).
- Tick and cross cards (one of each per child).
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile weather cards and the tactile season set (a felt snowflake, a felt flower, a felt sun, a felt leaf).

Steps

✎ Opening (3 min)

Greeting chant. Say **[snowy]**, **[foggy]** and **[cool]**; children do the lesson 1 actions. Ask **[What is the weather like?]** with the warm card; children do the action (rub hands, palms out).

Warm-up: four pictures of one place (7 min)

1. In the school language: "These four pictures all show the same place, Little Hill, at four different times of the year."
2. Point to the winter picture with an open hand: **[This is Little Hill.]** Then **[It is winter.]** and the winter action (make a snowball). Then point to the falling flakes and do the snowy action: **[It is snowy.]**
3. Do the same for **[spring]** (closed fingers open like a flower; **[It is rainy]**), **[summer]** (wipe your forehead; **[It is sunny]**) and **[autumn]** (fingers flutter down like leaves; **[It is foggy]**). Children copy each season action.
4. Point to a picture and ask **[What season is it?]**, with the big-circle gesture. Children answer with the action (or the word). Do all four, in a mixed order.

✎ Main activity (12 min)

1. **I see (4 min).** Show each small "I see" card and say the word: **[tree]**, **[flowers]**, **[leaves]**, **[snow]**, **[sun]**, **[clouds]**. Then point to your eye and to the thing on a large picture: **[I see snow]** (winter), **[I see flowers]** (spring), **[I see the sun]** (summer), **[I**

see leaves] (autumn). Pairs lay out their four small season pictures; when you say **[I see ___]**, they put that "I see" card on a picture where they can see it. More than one picture can be right (flowers are in spring and summer; the tree is in all four).

2. **Which season? (5 min).** Pairs keep their four small season pictures in front of them. Hold up a large weather card and say it, for example **[It is snowy.]**, then ask **[What season is it?]** Pairs hold up the picture with that weather; children do the season action. Use **[snowy]** (winter), **[rainy]** (spring), **[sunny]** (summer) and **[foggy]** (autumn), then mix them up.
3. **Season actions game (3 min).** Say a season word; children do the action. Then do an action silently; pairs hold up the matching small picture.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Why does the tree look different in each picture?" (In winter it has no leaves; in spring it has small new leaves; in summer it is full of leaves; in autumn the leaves fall.)
- "Is it snowy every day in winter in Little Hill?" (No. The picture shows one day. Weather changes from day to day; in the science unit, Little Hill usually has only a few snowy days in a winter month.)
- "Does every place in the world have these four seasons?" (No. Some places have a rainy season and a dry season, and when it is summer on one side of the world it is winter on the other. Little Hill has these four.)

✓ Closing check (with answers) (5 min)

Pairs use their four small season pictures; every child also has a tick and a cross card.

1. Say **[autumn]**; pairs hold up the picture.
2. Say **[spring]**; pairs hold up the picture.
3. Point to the large summer picture and ask **[What season is it?]**; children answer with the action or the word.
4. Point to the large winter picture and ask **[I see flowers?]** (as a question, the way the language asks it).

Answers: the autumn picture (falling leaves, fog); the spring picture (rain, flowers); summer (wipe your forehead); no (cross): there are no flowers in the winter picture; **[I see snow]**.

Vocabulary

New: **[winter]**, **[spring]**, **[summer]**, **[autumn]**, **[What season is it?]**, **[This is ___]**, **[I see ___]**, **[tree]**, **[flowers]**, **[leaves]**, **[snow]**, **[sun]**, **[clouds]**. Review: the weather words, **[It is ___]**, **[What is the weather like?]**, **[yes]**, **[no]**.

Differentiation

- **Support:** the child uses two pictures only (winter and summer) at first, then adds the other two.

- **Stretch:** the child says two sentences about a picture, for example **[It is summer. I see the sun.]**
- **Blind or low-vision children:** use the tactile season set: the felt snowflake for winter, the felt flower for spring, the felt sun for summer and the felt leaf for autumn. The child holds up the item instead of the picture, and the tactile weather cards in "Which season?". In "I see", the partner names what is in each picture.

⚠ Safety

- Pairs keep their cards on the desk; nobody needs to walk around in this lesson.

Teacher notes and misconceptions

- **[snowy]** is the weather and **[snow]** is the thing on the ground. If a child says **[I see snowy]**, say **[I see snow]** with them; do not correct sharply.
- Children who know a different climate may say "but where I lived, it rains in summer". Agree: "Yes, in some places it does. In Little Hill, the summer picture is sunny."
- The season actions are the author's choice. If an action means something unkind where you live, choose another and use it every time.
- Keep the Little Hill picture calendar (lesson 4) hidden: these four pictures show one kind of weather per season, but the calendar shows a different picture for each month.

Lesson 3: Twelve months

Unit overview - Previous: Lesson 2: Four seasons in Little Hill - Next: Lesson 4: The Little Hill calendar (pair game)

Goal: Children learn the months chant, put the twelve month cards in order, see which months make each Little Hill season, and answer **[What month is it?]** about the real month.

Length: about 30 minutes.

Materials

- The word card.
- The twelve large month cards (month name and number 1 to 12).
- A string or long strip of card on the wall, and pegs, clips or reusable sticky putty to fix the month cards to it.
- The four large Little Hill season pictures.
- Small month cards per pair (all twelve).
- Four small season pictures per pair.
- Tick and cross cards (one of each per child).
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile month cards and the tactile season set.

Steps

✎ Opening (3 min)

Greeting chant. Point to each large season picture and ask **[What season is it?]**; children answer with the season action or the word.

Warm-up: the months chant (7 min)

1. In the school language: "A year has twelve months. Every month has a name and a number."
2. Say the twelve months slowly, holding up each large card so the number shows, with one clap on each month: **[January]** (clap), **[February]** (clap) ... **[December]** (clap). Children clap along.
3. Say it again; children join in with any months they can. Then a third time, a little faster. The chant has no tune; a steady clap is enough. A teacher who wants a tune should use one they have made up, not a copyrighted song.

✎ Main activity (12 min)

1. **The month line (5 min).** Give the twelve large month cards to twelve children (or keep them, and let children point). Say the chant slowly. When a child's month is said, they bring the card to the string and fix it in the next place (the teacher helps), or hand it to the teacher from their seat. When all twelve are up, the class says the chant once more, reading along the line.

2. **Which comes next? (4 min).** Pairs lay out their small month cards in order, 1 to 12. Say a month, for example **[March]**; pairs point to it. Then, in the school language: "Point to the month that comes next." Say it together (**[April]**). Do this five or six times. Finish with **[December]**: what comes next? (**[January]**: the year starts again.)
3. **Seasons on the line (3 min).** Put the large season pictures under the month line: spring under March, April and May; summer under June, July and August; autumn under September, October and November; winter under January and February, and point to December at the other end: "In Little Hill, December is winter too." Say each group: **[March, April, May: spring]**, and so on. Pairs put their small season pictures under the right months on their desks.

Then add a new line to the greeting chant, from today: point to the real month on the line and ask **[What month is it?]**; answer together **[It is ___]**.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Why is winter at both ends of our line?" (Because the year goes round: after December comes January again, so winter runs across the end of one year and the start of the next.)
- "How do the numbers on the cards help?" (They show the order: January is 1 and December is 12.)
- "In Little Hill, is July in summer or in winter?" (Summer. In some places on the other side of the world, July is in winter.)

✓ Closing check (with answers) (5 min)

Pairs keep their small month cards in order; every child also has a tick and a cross card.

1. Say **[July]**; pairs point to it.
2. Say **[October]**; pairs point to it.
3. Point to April on the month line and ask **[Is it May?]**
4. Point to January on the month line and ask **[What season is it?]**

Answers: the July card (7); the October card (10); no (cross), it is April; winter (the snowball action, or the word).

Vocabulary

New: **[January]** to **[December]**, **[What month is it?]**. Review: **[winter]**, **[spring]**, **[summer]**, **[autumn]**, **[What season is it?]**, **[It is ___]**, numbers one to twelve, **[yes]**, **[no]**.

Differentiation

- **Support:** the child uses the numbers to find months ("March is 3") and joins in the chant by clapping only; that is fine.
- **Stretch:** the child says the chant alone, quietly, to a partner, or starts the chant from any month (for example from **[June]**) and goes round to the same month again.

- **Blind or low-vision children:** use the tactile month cards (raised numerals or braille numbers); the child lays them in a row along the desk edge. A partner says each month name as the child touches it. In "Seasons on the line", the child puts the tactile season items next to the right months.

⚠ Safety

- Children walk, not run, to the month line, one at a time. Anyone can take part from their seat by handing the card to the teacher.
- Fix cards with pegs, clips or putty, not pins.

Teacher notes and misconceptions

- **Never** ask children which month their birthday is in, or about holidays or festivals in a month. Keep the months about Little Hill and the school calendar on the wall.
- Twelve new words is a lot. In the check, children only need to **find** a month that is said, and they may use the chant or the numbers to do it.
- Which months make each season depends on where you live (see the season warning in the unit overview). These are Little Hill's seasons. If your own seasons are different, you can say so: "Here, it is different."
- Keep the Little Hill picture calendar hidden: there are no weather pictures on the month cards, and there should not be any on the month line.

Lesson 4: The Little Hill calendar (pair game)

Unit overview - Previous: Lesson 3: Twelve months - Next: Lesson 5: Guess my picture

Goal: Children ask and answer **[What is the weather like in ___?]** in an information-gap pair game, each partner holding half of the Little Hill picture calendar.

Length: about 30 minutes.

Materials

- The word card.
- The month line from lesson 3, still on the wall (month cards only, no weather pictures).
- **Calendar sheets per pair:** both sheets list the twelve months (number and name) down the side, each with a box. At the top of both sheets is a **weather key**: the eleven weather pictures in a row, drawn like the weather cards.
  - **Sheet A:** six boxes filled with the weather picture: January snowy, March windy, May warm, July hot, September cool, November cloudy. February, April, June, August, October and December have an empty box.
  - **Sheet B:** the other six boxes filled: February cold, April rainy, June sunny, August stormy, October foggy, December snowy. January, March, May, July, September and November have an empty box.
- A folder or book per pair to stand up as a screen.
- A pencil per child.
- Small weather cards per pair (all eleven), to place on a box instead of drawing.
- The large Little Hill picture calendar, kept hidden until the closing check.
- Tick and cross cards (one of each per child).
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile weather cards, tactile month cards and large-print copies of the sheets (see Differentiation).

Steps

✎ Opening (3 min)

Greeting chant, with **[What month is it?] [It is ___]** at the month line. Say **[stormy]**, **[warm]** and **[foggy]**; children do the actions.

Warm-up: half a calendar each (7 min)

1. In the school language: "Little Hill has a picture calendar. Every month has a weather picture. Each of you has half of the calendar. To fill the empty boxes, you ask your partner."
2. Show a sheet A: point to the filled boxes, the empty boxes and the weather key at the top. "You can draw the weather from the key, or put a small weather card on the box."
3. **Model it (3 min).** With a volunteer who has sheet B behind a screen, the teacher (with sheet A) points to February and asks **[What is the weather like in February?]** The volunteer answers **[In February it is cold]**, or just **[cold]**, or does the cold action, or holds

up the small cold card. The teacher draws the cold thermometer in February's box. Say: "Everyone will still ask about February in the game."

✎ Main activity: the pair game (12 min)

1. **Ask and fill (8 min).** Partners sit with a screen between them. Child A asks about each month with an empty box on sheet A, in order: February, April, June, August, October, December. Child B answers from sheet B, and A draws the weather (or places the small weather card). Then they swap: B asks about January, March, May, July, September and November, and A answers. Asking can be the whole question, just the month name with the "looking out" gesture, or pointing to the month on the month line with the gesture. Answers can be words, the action or the small card.
2. **Compare (2 min).** Partners take the screen away and put their sheets side by side. Every month should now have the same weather on both sheets. Fix any that are different by asking again.
3. **Seasons (2 min).** Pairs point to June, July and August on their sheet (summer in Little Hill) and say or show the three weather words together: **[sunny, hot, stormy]**. Then do the same for winter (December, January, February: **[snowy, snowy, cold]**).

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Why did you need to ask your partner?" (Because only your partner's sheet showed those months.)
- "Which months have a snowy picture?" (January and December.)
- "Is it really hot every day in July in Little Hill?" (No. It is one picture on a calendar. Real weather changes from day to day.)

✓ Closing check (with answers) (5 min)

Show the large Little Hill picture calendar. Children answer with the action, a small weather card, a tick or cross, or words:

1. **[What is the weather like in April?]**
2. **[What is the weather like in August?]**
3. Point to September: **[Is it cold?]**
4. **[What is the weather like in May?]**

Answers: rainy; stormy; no (cross), it is cool; warm.

Vocabulary

New: **[What is the weather like in ___?]**, **[In ___ it is ___]**. Review: the eleven weather words, the twelve months, **[yes]**, **[no]**.

Differentiation

- **Support:** the child fills only two or three empty boxes, choosing small weather cards instead of drawing; the partner may point to the picture on their own sheet after saying it.
- **Stretch:** the child asks every question in full and answers with the whole sentence **[In ___ it is ___]**; or the pair makes up a picture calendar for a second made-up town (for example Snowy Peak) and plays again.
- **Blind or low-vision children:** the partner says each answer, and the child places the matching tactile weather card next to that month's tactile month card in a row on the desk, instead of drawing. Low-vision children use large-print sheets.

⚠ Safety

- Pencils are used at desks and collected at the end.

Teacher notes and misconceptions

- This is an information gap: each partner really needs the other's half. Do not let children look over the screen, and keep the large picture calendar hidden until the closing check.
- Drawing the weather is not the language skill being practised. A rough drawing, the small weather card or a tick next to the right picture in the key all count.
- Some children answer with the season instead of the weather (**[summer]** for June). Accept it as a good try, and ask again: **[What is the weather like?]**
- The calendar pictures are made up by the author, like the rest of Little Hill, and are not a real place's weather.

Lesson 5: Guess my picture

Unit overview - Previous: Lesson 4: The Little Hill calendar (pair game)

Goal: Children describe a Little Hill season picture in up to three short pieces (the season, the weather, one thing they see), guess a partner's picture from a description, and the teacher starts the one-to-one check.

Length: about 30 minutes (the one-to-one check is spread over the week).

Materials

- The word card.
- The month line from lesson 3, still on the wall (for the greeting).
- The four large Little Hill season pictures.
- **Four small season pictures per child** (two sets per pair: one for the describer, one for the guesser).
- Six small "I see" cards per pair: tree, flowers, leaves, snow, sun, clouds.
- A folder or book per pair to stand up as a screen.
- Tick and cross cards (one of each per child).
- **Check things** (see the Assessment section of the unit overview): eight small weather cards (snowy, foggy, stormy, cool, sunny, rainy, windy, warm), the four small season pictures, six small month cards (January, March, May, July, October, December), the large Little Hill picture calendar, the six small "I see" cards, and the record sheet (class list with five columns).
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: the tactile season set (two per pair) and tactile weather cards.

Steps

✎ Opening (3 min)

Greeting chant, with **[What month is it?] [It is ___]** at the month line. Point to two large season pictures and ask **[What season is it?]**; children answer with the action or the word.

Warm-up: the teacher describes (7 min)

1. In the school language: "I will tell you about one picture, but I won't point. Hold up the picture you think it is."
2. Without looking at or pointing to the large pictures, say: **[This is Little Hill. It is autumn. It is foggy. I see leaves.]** Children hold up their small autumn picture. Then point to the large autumn picture to check.
3. Do the other three pictures in a mixed order, using the model descriptions in the unit overview.
4. **Harder:** leave out the season. Say **[It is rainy. I see flowers.]** (spring), then **[I see the sun.]** (summer).

✎ Main activity: guess my picture (12 min)

1. **Model it (2 min).** With a volunteer, the teacher stands a screen up and secretly chooses one small picture (summer). The teacher describes it: **[It is summer. It is sunny. I see the sun.]** The volunteer holds up their own summer picture. The teacher shows the hidden picture: it matches.
2. **Pairs play (8 min).** Partners sit with a screen between them, each with their own four small season pictures; the describer also has the six "I see" cards. The describer secretly chooses a picture and tells about it in up to three pieces: the season, the weather, and one thing they see. Any way counts: words, signs, the season and weather actions, or holding up an "I see" card. The guesser holds up their matching picture; then the describer shows the hidden one. Swap roles after each picture.
3. **Share (2 min).** Children who want to may describe one large picture to the class, in words or actions. Nobody has to.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Which piece helped you guess fastest?" (Usually the season, or a thing only one picture has, like snow or the sun.)
- "Why is **[I see a tree]** not enough on its own?" (The tree is in all four pictures.)

✓ Closing check (with answers) (5 min)

Children answer by holding up a small season picture, a tick or cross, an action or words:

1. Say **[It is sunny. I see flowers.]** Which picture?
2. Say **[I see snow.]** Which picture?
3. Say **[It is rainy.]** Which picture?
4. Point to the large autumn picture and ask **[Is it summer?]**.

Answers: summer (spring has flowers too, but it is rainy, not sunny); winter; spring; no (cross), it is autumn.

One-to-one check (over the week)

While the class plays "guess my picture" or the lesson 4 calendar game again, do the five-part check in the unit overview with each child (about 3 minutes each). Use the summer picture for part 5.

Vocabulary

Review: **[This is ___]**, **[I see ___]**, **[It is ___]**, the season words, the weather words, the "I see" words, **[What season is it?]**, **[What is the weather like?]**, **[yes]**, **[no]**. For the check: **[Tell me about the picture]**, **[What do you see?]** (said by the teacher; children only need to understand them).

Differentiation

- **Support:** the describer gives one piece only (the season action, or one "I see" card); the guesser chooses from two pictures, not four.
- **Stretch:** the describer gives four sentences, starting with **[This is Little Hill]**, or describes a picture without saying the season.
- **Blind or low-vision children:** use the tactile season sets (one each). The partner describes; the blind child holds up the matching tactile item. When the blind child describes, they choose a tactile item secretly and describe it in words, signs or actions.

⚠ Safety

- Pairs keep their cards on the desk; nobody needs to walk around in this lesson.

Teacher notes and misconceptions

- Describing one picture in three short pieces is all this unit asks (see Known gaps in the unit overview). A child who says only **[summer]** and holds up the sun card has described the picture in their own way.
- Some children will say true things that are not in the model descriptions (**[It is hot]** for summer, **[I see clouds]** for spring). Accept them; they are right.
- **[Tell me about the picture]** and **[What do you see?]** are new in the check but are said only by the teacher, with pointing to your eye and the picture. If a child does not understand them, ask the three short questions from the check instead, or use the school language: the check is about describing, not about these questions.

Grade 3 Second Language: Finding the Way (5 lessons, about 3 weeks)

> **Unreviewed AI draft.** Written by Claude Opus 5.5 (AI Village), 13 November 2026. No educator has reviewed or classroom-tested this unit. It is not aligned to any official standard. Check it against your school's rules before use. All places and routes in this unit belong to the made-up town of Little Hill. Children are never asked about their own homes, their way to school, where they go after school or any real route they take.
>
> Text-checked by four other agents (Gemini 3.5 Flash, Gemini 3.8 Flash, Gemini 4 Argon and Gemini 4 Carbon); see Known gaps.

Back to the grade 3 year plan - Term 3. Builds on grade 3 terms 1 and 2: The Market and Weather and Seasons, grade 2: A Short Scene, and the grade 3 society unit Maps, routes, and places.

In grade 2 children asked **[Where is the ___?]** and answered **[It is in / on / under the ___]**; in grade 3 they played information-gap pair games behind a screen. This unit adds four direction words (**[left]**, **[right]**, **[straight on]**, **[stop]**), the instructions **[Turn left]**, **[Turn right]** and **[Go straight on]**, nine place names with their signs, two new position words (**[next to]** and **[opposite]**), and the polite question **[Excuse me, where is the ___?]**. At the end, children move a token along a route on a map of Little Hill when they hear the directions, and some give a short route to a partner.

Which language?

This unit works with any language the school teaches. Before lesson 1, fill in the **word card** below. In the lessons, words in square brackets, like **[Turn left]**, mean "say this in the language you are teaching".

English meaning	Your language	Gesture or picture to go with it
left, right		hold up the hand on that side (the hand with the wristband sticker is the left hand)
straight on		both hands flat, pointing forwards, move ahead together
stop		one hand up, palm out
Turn left / Turn right		the arm on that side sweeps round to the side
Go straight on		as straight on, a little longer
on the left / on the right		pat the side of the desk on that side
bakery, post office, library, market, café, toy shop, park, pond, bridge		the nine place cards and their sign symbols (below)
next to		two fists side by side, touching
opposite		two flat hands facing each other, a gap between them
Where is the ___? / It is next to ___ / It is opposite ___		open hands and a questioning face; then the next to or opposite gesture

English meaning	Your language	Gesture or picture to go with it
Excuse me / Thank you		a small raised hand; a nod and a smile
Stop at the ___		the stop hand, then point to the place
What is on the left / on the right? / What is opposite?		a questioning face, then pat the desk on that side, or the opposite gesture
Is this the ___? / Is the ___ next to / opposite the ___? / Is the ___ on the left?		a questioning face; answers with yes or no (tick or cross card)
(review from grade 2) Where is the ___? / It is in / on / under the ___		as in grade 2
(review) one to twenty, yes, no, please		as in earlier units

The gestures are the author's choice; keep them the same every time.

Left and right warning: left and right depend on which way you are facing. When the teacher faces the class and holds up the left hand, the children see it on **their** right. In this unit the teacher **turns round** (back to the class, looking the same way as the children) to show **[left]** and **[right]**, or shows them on the token. On the map, left and right are always the token's left and right, and the token's arrow shows which way it faces. Many children (and adults) mix up left and right; that is normal, and it is why there is a wristband sticker.

Grammar warning: languages give directions in different ways. Some use a separate word for "turn", some use one word for "turn left"; some say "straight ahead", "go forward" or "always straight". **[next to]** and **[opposite]** may change the noun after them (for example a different case or a small word before it): say **[It is next to the market]** the way a fluent speaker would. Children only need to **understand** the phrases and **show** their answers; saying them is invited, never required.

Directions warning: not every language or community gives directions with left and right. Some use compass directions (north, south, east, west) or the land (uphill, downhill, towards the river) even for small distances, and many people give directions by landmarks ("past the bakery"). Little Hill uses left and right because the year plan asks for them. If your language usually does it differently, teach the usual way as an extra, but keep the Little Hill routes the same.

Sign language warning: if the language is a sign language, directions and places are shown **in the space** in front of the signer, and the signer's left is the watcher's right. That is the language, and it is fine. In the checks, ask the child to move the token or point to the map instead, so the sign itself does not give the answer away.

The Little Hill map

All five lessons, the pair game and the one-to-one check use the same **map of Little Hill**. It is a made-up town, drawn from above, with north at the top. Made up by the author; free to change, but change it everywhere.

- **Bridge Road** runs up the middle of the map, from the **START star** at the bottom to the **bridge** over the river at the top.
- **Main Street** runs across the middle. Where it meets Bridge Road is **the crossroads**.
- Every place is a box with its **name** and its **sign** (a simple picture) on it. There are nine places:

Place	Where it is on the map	Sign
bakery	lower Bridge Road, left side (west)	a loaf of bread
post office	lower Bridge Road, right side (east), **opposite** the bakery	an envelope
library	Main Street, left of the crossroads, top side (north), with grass between it and the crossroads	an open book
market	Main Street, at the left end (west), top side, **next to** the library	a basket of apples
café (Remy's café)	Main Street, right of the crossroads, top side (north)	a cup
toy shop	Main Street, right of the crossroads, bottom side (south), **opposite** the café	a ball
park	Main Street, at the right end (east), top side, **next to** the café	a tree
pond	upper Bridge Road, left side (west), at the top	a duck
bridge	the top end of Bridge Road, over the river, **next to** the pond	an arch

Everything else on the map is grass, so these are the only "next to" and "opposite" pairs:

- **opposite:** bakery and post office; café and toy shop.
- **next to:** library and market; café and park; pond and bridge.

The bottom side of Main Street to the left of the crossroads, the space next to the toy shop, and the right side of upper Bridge Road are grass. **Draw the grass gaps clearly**, so that, for example, the library is not "next to" the crossroads or the pond.

Routes. The token is a card arrow. It always starts on the START star, **facing up the map** (north). Routes use only these instructions:

- **[Go straight on]**: move the token up Bridge Road to the crossroads; at the crossroads, **[Go straight on]** moves it up to the bridge.
- **[Turn left]** / **[Turn right]** at the crossroads: turn the token to face along Main Street that way, then move it along.
- **[Stop at the ___]**: stop the token beside that place, even partway along a road.

Route (from START, facing up)	Where the token ends	What is on the left and right on the way
Go straight on. Stop at the bakery.	beside the bakery	bakery on the left, post office on the right
Go straight on. Turn left. Stop at the library.	beside the library	library on the right (north side, when facing left/west)
Go straight on. Turn left. Stop at the market.	at the market (end of Main Street)	library on the right on the way
Go straight on. Turn right. Stop at the café.	beside the café	café on the left, toy shop on the right
Go straight on. Turn right. Stop at the park.	at the park (end of Main Street)	café on the left and toy shop on the right on the way
Go straight on. Go straight on. Stop at the pond.	beside the pond	pond on the left
Go straight on. Go straight on. Stop at the bridge.	at the bridge	pond on the left on the way

Note for the teacher: after **[Turn left]**, the token faces left (west), so the top side of Main Street is on **its right**. After **[Turn right]**, the top side is on its left. Children do not need to explain this; it is why the token has an arrow.

Keep the full map away from the children until lesson 3. In lesson 2 they meet the places on cards; in lesson 4 each partner has only half of the labels.

Big idea

We can **find our way** in a new language: understand left, right and straight on, know places by their names and signs, say where a place is (**next to** or **opposite** another one), ask **[Where is the ___?]**, and follow a short route on a map.

Outcomes

By the end of the unit, most children can:

1. Show **[left]**, **[right]**, **[straight on]** and **[stop]** when they are said, with the gesture, an arrow card or the token.
2. Point to the right place card or sign when one of the nine place names is said.
3. Show which place is **[next to]** or **[opposite]** another on the Little Hill map, and answer **[Where is the ___?]** by pointing to the map or saying **[It is next to / opposite ___]**.
4. In the pair game, ask where a place is (the whole question, or the place card with the question gesture) and place it on their map from the answer.
5. Move the token along a two- or three-step route on the map when they hear it (for example **[Go straight on. Turn right. Stop at the café.]**).

Prior knowledge

- A Short Scene (grade 2): **[Where is the ___?]** and **[It is in / on / under the ___]**.
- The Market and Weather and Seasons (grade 3 terms 1 and 2): information-gap pair games with a screen; Little Hill as a made-up town.
- Grade 3 society, Maps, routes, and places: reading a simple map from above. It helps, but it is **not** needed here.
- Children who missed earlier units can still take part; every word has a card, a sign or a gesture.

Lessons

Keep the 1-minute greeting chant at the start of each day.

Lesson	Title	Time	Core idea
1	Left, right, straight on	30 min	The four direction words and three instructions, with gestures, arrow cards and a token on a crossroads card
2	Places and signs	30 min	The nine place names and their signs; **[Where is the ___?]** with signs around the room
3	Next to and opposite	30 min	**[next to]** and **[opposite]** on the Little Hill map; building the map from spoken clues
4	Excuse me, where is the café? (pair game)	30 min	An information-gap pair game: each partner's map has only some of the places labelled

Lesson	Title	Time	Core idea
5	Follow my directions	30 min	Moving the token along spoken routes, giving a route to a partner, and the one-to-one check

Timings: every lesson is 30 minutes (3 + 7 + 12 + 3 + 5; in lesson 5 the one-to-one check is spread over the week).

Materials

Whole class unless noted.

- The filled-in word card (above), kept where the teacher can see it.
- **Wristband stickers:** one small sticker per child, worn on the back of the **left** hand, or a loose paper wristband (never tight) for children who prefer not to wear a sticker. Latex-free.
- **Four large arrow cards:** an arrow pointing left, an arrow pointing right, an arrow pointing up (straight on) and a hand (stop). Each card has a clear shape, not colour alone.
- **Small arrow cards per child:** the same four, small enough to hold up (lessons 1 and 5).
- **Crossroads cards per pair** (lesson 1): a card with a plus-shaped road drawn on it (one road up and down, one across) and a star at the bottom, no places.
- **Tokens:** one per pair (lessons 1, 3 and 5) and one for the check: a small card arrow (for example a triangle of thick card), with a clear point and a dot at the back, about 3 cm long.
- **Nine large place cards:** each with the place name written in the language and its sign (see the map table). Big enough to see from the back of the room.
- **Nine small place cards per pair** (lessons 2, 3 and 4): the same name and sign, sized to fit a box on the pair map.
- **The large Little Hill map** (above): a poster with all nine places labelled. Kept hidden until lesson 3.
- **Blank pair maps** (lesson 3, one per pair): the Little Hill map with the roads, the START star, the river and the nine boxes drawn, but the boxes empty.
- **Pair-game sheets per pair** (lesson 4): sheet A, sheet B and their answer strips (see lesson 4), a folder or book to stand up as a screen, and a pencil per child.
- **Pair maps with all nine places labelled** (lesson 5, one per pair): small copies of the large map.
- **Route strips** (lesson 5): strips of card with picture steps (up arrow, left arrow, right arrow, hand, then a place sign), as listed in lesson 5.
- **Tick and cross cards:** one of each per child, as in earlier units.
- **Check things** (lesson 5): one token, one crossroads card, six small place cards (bakery, post office, library, café, park, bridge), a pair map with all nine places labelled, and the record sheet (class list with five columns).
- Paper and pencils for children who want to draw or write (every lesson).
- A lap tray for a child in a wheelchair, if needed (every lesson).
- Ear defenders and a quiet spot, as in every unit.
- Optional, for blind or low-vision children: **tactile arrow cards** (raised arrows and a raised hand outline), a **tactile token** (a card triangle with a raised ridge down the middle and a felt dot at the back), a **tactile crossroads card** (roads made of glued string, a raised star at the bottom), **tactile place cards** (the sign as a raised shape or a small object glued on: a pasta "loaf" shape for the bakery, a folded paper envelope, a mini card book, a dried-bean apple pile in a paper basket, a felt cup, a small bead ball, a felt tree, a felt duck, a card arch), **tactile route strips** (lesson 5: the same steps as raised arrows and a raised hand, with the tactile sign glued at the end), and a **tactile Little Hill map** with string

roads, a raised star, a raised wavy river line and box outlines in raised lines, the boxes big enough for a tactile place card. Large-print copies of all sheets and strips.
- Optional: a fluent speaker's recording of the word card and the routes.

⚠ Safety and access

Safety

- Every movement in this unit can be done seated. If children stand to turn left and right, they turn on the spot beside their chair, with space around them; nobody walks around the room with eyes closed or follows directions blindfolded.
- In lesson 2 the large place cards are fixed to the walls at a height every child can see and reach from a chair, away from doors and heaters; children point from their seats or walk, not run, to a card.
- Tokens, small cards and the tactile items are not put in mouths; use pasta and beans only where no child is likely to eat them, and check for allergies first. Pencils are used at desks and collected at the end.

Privacy and feelings

- **Never ask** children where they live, how they come to school, where they go after school, which shops their family uses, or to draw or describe any real route. All places and routes are in Little Hill.
- If a child volunteers a real route or address, thank them, and move gently back to Little Hill. Do not write it down or repeat it.
- Some children find left and right hard for a long time, and some have dyspraxia or other differences that make it harder. Never laugh at a wrong turn; the wristband sticker and the token are there to help, not to mark anyone out.

Taking part

- **Speaking is optional.** Pointing, gestures, holding up arrow cards, moving the token and placing cards all count. Never make a child speak or move alone in front of others.
- **Movement:** every gesture has a seated, hands-only version. Turning on the spot is never required.
- **Children new to the school language:** keep gestures identical every time and accept answers in any language.
- **Noise:** quiet spot and ear defenders allowed; in whole-class games children answer with cards or gestures, not shouting.

Seeing, hearing and colour

- **Colour vision:** arrow cards, signs and the map use shapes and words, never colour alone. Roads, grass and the river differ by pattern (grass hatched, the river with wavy lines). If a child mixes up only colours, do not record it as a language gap.
- **Blind children:** use the tactile arrow cards, tactile token, tactile crossroads card, tactile place cards and the tactile map. Before each activity, guide the child's hand once along the roads from the star. Keep check things in fixed places and say where each one is. Moving the tactile token, or pointing to a tactile place card, is a full answer.
- **Low-vision children:** large, high-contrast cards and maps; seat them near the large map, or give them their own large-print copy.

- **Deaf or hard-of-hearing children:** keep your face visible; do the gesture or show the card every time you say the word. When showing left and right with your back turned, glance over your shoulder or hold up the arrow card as well.
- **Wheelchair users:** all activities are on desks or a lap tray; the token and small cards fit on a lap tray. In lesson 1 the "turn" can be shown with the arms or the token.

Assessment

Lesson 5 includes a five-part check, done one-to-one (about 3 minutes each child; spread over the week). Ask everything without gestures and without pointing or looking at the answer. Record each part as **yes**, **with help** or **not yet**:

1. **Direction words:** put the token on the crossroads card at the star, facing up. Say **[left]**, **[right]**, **[straight on]** and **[stop]**, one at a time, in a mixed order; for each, the child shows it by turning or moving the token (for **[stop]**, the token does not move), by holding up the small arrow card, or with the gesture. Yes = four of four.
2. **Places:** lay out the six small place cards (bakery, post office, library, café, park, bridge), shuffled. Say **[library]**, **[café]**, **[post office]** and **[bridge]**; the child points to each. Yes = four of four.
3. **Next to and opposite:** show the pair map with all nine places labelled. Ask **[Where is the post office?]** and **[Where is the market?]**. The child points to the place on the map, or says **[It is opposite the bakery]** / **[It is next to the library]**. Then point to the café and ask **[Is the toy shop next to the café?]** (no; it is opposite). Yes = all three.
4. **Asking:** put the small café card in front of the child. Say, in the school language, "Ask me where this is." The child asks **[Where is the café?]** (or **[Excuse me, where is the café?]**), or shows the café card with the question gesture. Answer, and thank them. Yes = they ask in any of these ways.
5. **Follow a route:** put the token on START on the pair map, facing up. Say **[Go straight on. Turn right. Stop at the park.]**, then, from START again, **[Go straight on. Turn left. Stop at the library.]**. The child moves the token. Small slips in how far the token goes do not matter; the turns and the stopping place do. Yes = both routes.

Doing it in their own way (pointing, signs, gestures, the child's usual access) counts as **yes**. "Not yet" is normal for some children; the games can be played again any time. **Giving** a route to a partner in lesson 5 is a stretch and is **not** recorded: notice it, but do not score it. Mixing up left and right is recorded as it happened, with a note if the child corrected it using the wristband sticker (that counts as **with help**).

Sources

- NCSSFL-ACTFL Can-Do Statements, Novice: https://www.actfl.org/uploads/files/general/Resources-Publications/Can-Do-Novice.pdf (read 13 November 2026; the quoted lines and their sublevels were checked against the PDF page layout). These are performance indicators and examples, not a curriculum, and the unit is not a full alignment. Lines used for this unit, quoted exactly:
  - Interpretive, informational texts, Novice Low (PDF page 15): written example "I can identify some locations or stores by their signs." (the place signs, lesson 2; outcome 2); spoken, viewed, or signed example "I can understand simple directions to a familiar place." (lessons 1 and 5; outcomes 1 and 5).

    - Same page, Novice High example: "I can follow directions in a scavenger hunt game." (following a route to find a place, lesson 5; a stretch beyond Novice Low).
    - Interpersonal, Novice Low (PDF page 19): "I can provide information by answering a few simple questions" (answering **[Where is the ___?]**; outcomes 3 and 4).
    - Interpersonal, Novice High (PDF page 21), speaking example: "I can ask for directions when I'm lost." (asking **[Excuse me, where is the ___?]** in the pair game; a stretch, and Little Hill is made up, so nobody is really lost).
    - Presentational, Novice Low (PDF page 23), writing example: "I can write the names of places on a map." (the optional stretch in lesson 3: writing place names on the blank map; most children place cards instead).
    - Same page, Novice Mid example: "I can tell the location of a city relative to another city on a map." (the unit uses places in one town, not cities: **[It is next to / opposite ___]**; outcome 3).
    - Same page, Novice High example: "I can give simple directions to a nearby location." (giving a route to a partner in lesson 5; a stretch, not recorded).
- Wikipedia, "Guugu Yimithirr language": https://en.wikipedia.org/wiki/Guugu_Yimithirr_language (read 13 November 2026). The article says the language "is notable for its use of pure geographic directions (north, south, east, west) rather than egocentric directions (left, right, forward, backward)", adding that such "purity" is disputed. This is the reason for the directions warning above; it is one example, not a survey of languages.
- Wikipedia, "Total physical response": https://en.wikipedia.org/wiki/Total_physical_response . As in earlier units: commands answered with actions, listening before speaking, low stress (lessons 1 and 5).
- Wikipedia, "Information gap task": https://en.wikipedia.org/wiki/Information_gap_task (read 9 November 2026). Learners are missing information and must communicate to fill the gap. The pair game in lesson 4 is an information gap: each partner's map has only some of the places labelled.

Known gaps and cautions

- Four other agents (Gemini 3.5 Flash, Gemini 3.8 Flash, Gemini 4 Argon and Gemini 4 Carbon, all at ce47029) text-checked this unit on 2026-11-13. Three reported no errors; Gemini 4 Carbon reported two items (question phrases missing from the word card; tactile place cards, tactile crossroads card and tick and cross cards missing from lesson 5 Materials), fixed in 83e6bd1, and Gemini 4 Argon and Gemini 4 Carbon re-checked the fix. Those are text checks by AI agents, not a teacher review, classroom test or physical safety assessment.
- **No pronunciation help**, as in earlier units. Use a fluent speaker's recording if needed.
- **Left and right are hard.** Many children are still learning which is which in their first language at this age; the unit gives the wristband sticker and the token's arrow as help, and records "with help" honestly. Outcome 1 is about the words, but a child's own left-right confusion can look like a language gap.
- **The map, the place names, the signs, the gestures and the routes are the author's.** The Can-Do Statements describe what learners can do; they do not list words or places for a grade 3 class. Several of the lines quoted are Novice Mid or Novice High examples, used here as stretches.
- Routes are short (at most one turn) and only on the Little Hill map. Real directions with distances ("the second street"), compass words, "past", "before" and "after" are not taught. Writing directions is not taught.

- The year plan says "asking for and giving directions". In this unit children **ask where** a place is and **answer with next to or opposite**; **giving** a whole route is only a stretch in lesson 5. Asking for directions in the full sense ("How do I get to ___?") is not taught.
- Timings are untested.

The lesson order matters: children learn the direction words with the token (lesson 1) before they need them on the map; they meet the places by their signs (lesson 2) before they place them on the map with **[next to]** and **[opposite]** (lesson 3); they need both for the pair game (lesson 4); and following whole routes comes last (lesson 5).

Lesson 1: Left, right, straight on

Unit overview - Next: Lesson 2: Places and signs

Goal: Children show **[left]**, **[right]**, **[straight on]** and **[stop]** with a gesture, an arrow card or a token, and move a token on a crossroads card when they hear **[Go straight on]**, **[Turn left]**, **[Turn right]** and **[Stop]**.

Length: about 30 minutes.

Materials

- The word card.
- Wristband stickers (one per child, latex-free), and loose paper wristbands for children who prefer not to wear a sticker.
- The four large arrow cards: left, right, up (straight on) and a hand (stop).
- Small arrow cards: one set of four per child.
- Crossroads cards: one per pair, plus the check crossroads card for the teacher.
- Tokens: one per pair, plus the check token for the teacher.
- Paper and pencils for children who want to draw or write.
- A lap tray for a child in a wheelchair, if needed.
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile arrow cards, a tactile token and a tactile crossroads card (see the unit Materials); large-print arrow cards.

Steps

✎ Opening (3 min)

Greeting chant. In the school language: "Today we learn to find our way. First, a sticker for your **left** hand." Help each child put a wristband sticker on the back of the left hand, or give a loose paper wristband instead. No child has to wear one; a child who does not want one can keep a small arrow card on the left side of the desk.

Warm-up: show me (7 min)

1. **Turn round (2 min).** Stand with your back to the class, so you face the same way as the children. Hold up your left hand and say **[left]**; children hold up the hand with the sticker. Do the same for **[right]**. Glance over your shoulder each time, so children who lip-read can see your face.
2. **The other two words (2 min).** Still facing the same way as the class, show **[straight on]** (both hands flat, pointing forwards, moving ahead) and **[stop]** (one hand up, palm out). Children copy.
3. **Arrow cards (3 min).** Turn back to face the class. Hold up each large arrow card and say its word; children do the gesture. Then say the words in a mixed order without the cards; children do the gesture. Nobody is "out". Children who like to can stand and turn on the spot beside their chair for **[Turn left]** and **[Turn right]**; everyone else turns with the arm sweep.

✎ Main activity: the token on the crossroads (12 min)

1. **Model it (3 min).** Hold up the check crossroads card flat, facing the class, with the star at the bottom. Put the check token on the star, its point facing up the card. Say: "The token is a little person. Its point shows where it is looking. Left and right are **its** left and right." Say **[Go straight on]** and move the token up to the crossroads. Say **[Turn left]** and turn the token to point along the road to the left. Say **[Go straight on]** and move it along; then **[Stop]**. Do it again with **[Turn right]**.

2. **Pairs (6 min).** Each pair has a crossroads card and a token. One child moves the token; the partner checks with their wristband sticker. Say each sequence slowly, then swap roles after each one:

    - **[Go straight on. Stop.]** (the token stops at the crossroads, still pointing up)
    - **[Go straight on. Turn right. Go straight on. Stop.]** (it ends on the right-hand road, pointing right)
    - **[Go straight on. Turn left. Go straight on. Stop.]** (it ends on the left-hand road, pointing left)
    - **[Go straight on. Go straight on. Stop.]** (it ends at the top of the card, pointing up)

    Walk round. If a token turns the wrong way, point to the wristband sticker and to the token's point; do not say "wrong".

3. **Small arrow cards (3 min).** Children put the token down and hold their four small arrow cards. Say a word; children hold up the matching card. Then invite volunteers to say a word for the class to show. Speaking is invited, never required; a volunteer can hold up a large arrow card instead.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Why did I turn round to show left and right?" (Because when I face you, my left hand is on your right side. Turning round, we all face the same way.)
- "At the star, which way does the token point?" (Up the card, towards the crossroads.)
- "After **[Turn right]**, which way does the token point?" (Along the road to the right.)

✓ Closing check (with answers) (5 min)

Children answer with a small arrow card or the gesture. Say each word without doing the gesture:

1. **[right]**
2. **[stop]**
3. **[straight on]**
4. **[left]**
5. Hold up the check crossroads card with the token at the crossroads, pointing up. Say **[Turn left]**. "Which way is the token pointing now?" Children hold up an arrow card.

Answers: the right arrow; the hand; the up arrow; the left arrow; the left arrow.

Vocabulary

New: **[left]**, **[right]**, **[straight on]**, **[stop]**, **[Turn left]**, **[Turn right]**, **[Go straight on]**.
Review: the greeting chant, **[yes]**, **[no]**.

Differentiation

- **Support:** practise only **[left]** and **[right]** first, with the wristband sticker, then add the other two. The partner may move the token first while the child watches, then the child does the same.
- **Stretch:** the child gives a sequence to their partner, saying the instructions while the partner moves the token. Or, with the token stopped on a road, the child pats the side of the desk and says **[on the left]** or **[on the right]** for the side of the road the partner points to.
- **Blind or low-vision children:** before the pair work, guide the child's hand once along the string roads of the tactile crossroads card, from the raised star up to the crossroads and along each side road. The child feels the ridge on the tactile token to know where it points, and holds up tactile arrow cards in the closing check. Low-vision children use large-print arrow cards.

⚠ Safety

- Turning on the spot is optional and only beside the child's own chair, with space around them. Nobody turns with eyes closed.
- Wristband stickers go on the back of the hand only, never the face; paper wristbands are loose. Use latex-free stickers.
- Tokens and cards are not put in mouths. Pencils are used at desks and collected at the end.

Teacher notes and misconceptions

- Facing the class and holding up your left hand shows the children a hand on **their** right. That is why you turn round in the warm-up and use the token's point in the main activity.
- Many children are still learning left and right in their first language. Mixing them up is not a language mistake; the wristband sticker is the help.
- When the token points left or right, its left and the child's left are not the same. In this lesson children only turn the token at the crossroads. Some children find it easier to turn the whole card so that the token points away from them; let them.
- Keep the gestures exactly the same every time, as written on the word card.

Lesson 2: Places and signs

Unit overview - Previous: Lesson 1: Left, right, straight on - Next: Lesson 3: Next to and opposite

Goal: Children point to the right place card or sign when they hear one of the nine place names, and answer **[Where is the ___?]** by pointing.

Length: about 30 minutes.

Materials

- The word card.
- The four large arrow cards (for the opening).
- The nine large place cards, ready to fix to the walls. Fix them at a height every child can see and reach from a chair, away from doors and heaters.
- Small place cards: one set of nine per pair.
- Tick and cross cards (one of each per child).
- Paper and pencils for children who want to draw or write.
- A lap tray for a child in a wheelchair, if needed.
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: tactile place cards (see the unit Materials); large-print small place cards.
- Keep the large Little Hill map hidden; it is used from lesson 3.

Steps

✎ Opening (3 min)

Greeting chant. Hold up the large arrow cards in a mixed order; children do the gesture for **[left]**, **[right]**, **[straight on]** and **[stop]**. Turn round to show left and right, as in lesson 1.

Warm-up: nine places (7 min)

1. In the school language: "Little Hill is a made-up town. Today we meet its places. Every place has a name and a sign, so you can find it even if you cannot read the word."
2. **Three at a time (5 min).** Hold up a large place card, say its name and point to its sign; children point to the sign too, and may say the name. Fix the card to the wall. Do three places, then say those three names in a mixed order while children point to the cards on the wall. Then the next three, then the last three:
    - bakery (loaf), post office (envelope), library (open book);
    - market (basket of apples), café (cup), toy shop (ball);
    - park (tree), pond (duck), bridge (arch).
3. **Signs only (2 min).** Point to a card on the wall and cover its name with your hand. Children say or show which place it is (for example, by pointing to the same small card later, or by saying the name). Do four or five cards.

✎ Main activity: Where is the ___? (12 min)

1. **Model it (2 min).** Review the grade 2 question: say **[Where is the bakery?]** with open hands and a questioning face, then point to the bakery card on the wall. Ask two more; children point from their seats.
2. **Point and find (4 min).** Ask **[Where is the ___?]** for each of the nine places in a mixed order. Children point from their seats. After each one, invite a volunteer to walk (not run) to the card and touch it, or to point to it from their seat. Volunteers only; nobody has to go.
3. **Pairs (6 min).** Each pair spreads its nine small place cards face up between them. Child A asks **[Where is the ___?]** for any place; child B points to that small card (or picks it up and shows it). After four questions they swap. A child who does not want to speak can ask by pointing to a card on the wall with the questioning face; the partner then finds the small card that matches. Walk round and listen.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "How can you find the bakery if you cannot read the word yet?" (By its sign, the loaf of bread.)
- "In which Little Hill places can you buy something?" (The bakery, the market, the café, the toy shop, and stamps at the post office. In the library you borrow books. The park, the pond and the bridge are not shops.)
- "Is Little Hill a real town?" (No, it is made up. That is why we can all find our way in it.)

✓ Closing check (with answers) (5 min)

Children point to a card on the wall, hold up a small place card, or hold up a tick or cross card:

1. **[Where is the library?]**
2. **[Where is the pond?]**
3. Hold up the large café card: **[Is this the toy shop?]**
4. Point to the bridge card and cover its name: "Which place is this?"

Answers: the library card (open book); the pond card (duck); no (cross), it is the café; the bridge.

Vocabulary

New: **[bakery]**, **[post office]**, **[library]**, **[market]**, **[café]**, **[toy shop]**, **[park]**, **[pond]**, **[bridge]**. Review: **[Where is the ___?]**, **[left]**, **[right]**, **[straight on]**, **[stop]**, **[yes]**, **[no]**.

Differentiation

- **Support:** in the pair game, the child uses only the first three or six places; the partner may point to the wall card first.

- **Stretch:** the child asks and answers in full, adding **[Excuse me]** before the question and **[Thank you]** after it. Or the child copies two or three place names from the small cards onto paper, next to a drawing of the sign.
- **Blind or low-vision children:** instead of the wall cards, the child has the nine tactile place cards in a row on the desk (or lap tray), always in the same order; say where each one is the first time. In the games, the child touches the tactile card when the place is named. Low-vision children use large-print small place cards and sit near the wall cards.

⚠ Safety

- The wall cards are at a height every child can reach from a chair, away from doors and heaters. Children walk, not run, to a card; volunteers only.
- Tactile place cards with pasta or beans are used only after checking for allergies, and only where no child is likely to eat them. Cards and tactile items are not put in mouths.
- Pencils are used at desks and collected at the end.

Teacher notes and misconceptions

- **Do not ask** which shops the children's families use, or where their own bakery or library is. Keep every place in Little Hill. If a child tells you about a real shop, thank them and move back to Little Hill.
- The signs are the author's choice and stand for the place, not for something you can buy there: the apple basket means "market", not "apples". If a child says **[apple]** for the market card, accept it as a good try and say **[market]**.
- Some languages use a borrowed word for some places (for example a word close to "café" or "park"). That is fine; teach the word a fluent speaker would use.
- Leave the large place cards on the walls if you can; they help in lessons 3 and 4.

Lesson 3: Next to and opposite

Unit overview - Previous: Lesson 2: Places and signs - Next: Lesson 4: Excuse me, where is the café? (pair game)

Goal: Children show which place is **[next to]** or **[opposite]** another, build the Little Hill map from spoken clues, and answer **[Where is the ___?]** with **[It is next to / opposite ___]** or by pointing.

Length: about 30 minutes.

Materials

- The word card.
- The nine large place cards, still on the walls from lesson 2 (if you took them down, any place to show them will do).
- The large Little Hill map, kept face down or covered until the end of the main activity.
- Blank pair maps: one per pair, plus one for the teacher to hold up (roads, START star, river and the nine empty boxes).
- Small place cards: one set of nine per pair.
- Tokens: one per pair.
- Tick and cross cards (one of each per child).
- Paper and pencils (pencils are also the "road" in the warm-up; paper for the writing stretch).
- A lap tray for a child in a wheelchair, if needed.
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: the tactile Little Hill map, tactile place cards and a tactile token (see the unit Materials); large-print blank maps.

Steps

✎ Opening (3 min)

Greeting chant. Each pair puts its token on the START star of its blank pair map, pointing up. Say **[Go straight on]** (to the crossroads), **[Turn right]**, **[Go straight on]**, **[Stop]**. Then back to START for **[Go straight on. Go straight on. Stop.]** (up to the river). Children keep the token beside the map afterwards.

Warm-up: next to and opposite (7 min)

1. **Gestures (2 min).** Show **[next to]** (two fists side by side, touching) and **[opposite]** (two flat hands facing each other with a gap). Children copy. Say each word a few times in a mixed order; children show the gesture.
2. **Cards on the desk (5 min).** Each pair takes out the bakery and post office cards. Lay a pencil on the desk: "This is a road." Put the two cards side by side on the same side of the pencil, touching: **[The bakery is next to the post office]**. Then put them on opposite sides of the pencil, facing each other: **[The bakery is opposite the post office]**. Pairs copy each arrangement. Then say **[next to]** or **[opposite]**, and pairs arrange their two

cards; repeat with other pairs of cards (for example the café and the park). Remind them: "Opposite means across the road. Next to means side by side, with nothing between."

✎ Main activity: build the map (12 min)

1. **Model it (3 min).** Hold up your blank pair map and point to START, Bridge Road, Main Street, the crossroads and the river. Say: "Every box is a place. I will tell you where the places are. You put the small card in its box." Point to the box on the left of lower Bridge Road: "The bakery is here." Pairs put the bakery card there. Then say **[The post office is opposite the bakery]**, with the opposite gesture. Wait; pairs find the box across the road and put the post office card in it. Hold up your map to show it.

2. **Clues (7 min).** Give the clues one at a time, with the gesture each time, and wait for every pair before going on. Some places you point to on your map; the others come from the clue:

    - Point: "The library is here" (Main Street, left of the crossroads, top side). Then **[The market is next to the library]**.
    - Point: "The café is here" (Main Street, right of the crossroads, top side). Then **[The toy shop is opposite the café]** and **[The park is next to the café]**.
    - Point to the box on the river: "The bridge is here." Then **[The pond is next to the bridge]**.

    Each clue has only one possible box, because everything else is grass. If a pair is stuck, ask **[Where is the café?]** and let them find their café card first.

3. **Check (2 min).** Uncover the large Little Hill map. Pairs compare their map with it and move any card that is in the wrong box.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Is the library next to the café?" (No. The crossroads and the grass are between them.)
- "Why is the library not next to the crossroads?" (There is grass between them. Next to means nothing in between.)
- "What is opposite the toy shop?" (The café. They face each other across Main Street.)

✓ Closing check (with answers) (5 min)

Use the large Little Hill map. Children point to their own pair map, use the gestures, hold up a tick or cross card, or say the answer:

1. **[Where is the market?]**
2. **[Where is the toy shop?]**
3. Point to the pond: **[Is the pond next to the bridge?]**
4. **[Is the park opposite the café?]**

Answers: next to the library; opposite the café; yes (tick); no (cross), it is next to the café.

Vocabulary

New: **[next to]**, **[opposite]**, **[It is next to ___]**, **[It is opposite ___]**. Review: the nine place names, **[Where is the ___?]**, **[left]**, **[right]**, **[straight on]**, **[stop]**, **[yes]**, **[no]**.

Differentiation

- **Support:** the child works with a partner who places the card first; the child then shows the gesture for **[next to]** or **[opposite]**. Or give the clue and then point to the right box for that pair.
- **Stretch:** after the check, the child writes the names of three or more places on paper beside a small drawing of the map, copying from the small cards, or says each clue back in full (**[The market is next to the library]**).
- **Blind or low-vision children:** before the clues, guide the child's hand along the string roads of the tactile map, from the raised star to the crossroads, along Main Street both ways, and up to the river line, and let them feel the empty box outlines. A partner or adult says each clue, and the child puts the tactile place card in the box. For the check, an adult says which places are in which boxes, and the child checks by touch. Low-vision children use a large-print blank map.

⚠ Safety

- Tokens, small cards and tactile items are not put in mouths. Tactile items with pasta or beans are used only after checking for allergies.
- Pencils are used at desks and collected at the end.

Teacher notes and misconceptions

- **Opposite** means across the road, facing; **next to** means on the same side, side by side, with nothing between. Some children say "next to" for anything nearby. Point to the grass gaps on the large map and ask: "Is anything between them?"
- In some languages **[next to]** or **[opposite]** changes the place word after it. Say the clue the way a fluent speaker would; children only need to understand it and place the card.
- Keep the large map covered until step 3, so the clues are a real challenge. From now on it can stay up, except in lesson 4, when it is hidden again.
- Writing the names is a stretch. Placing the small cards is the language task.

Lesson 4: Excuse me, where is the café? (pair game)

Unit overview - Previous: Lesson 3: Next to and opposite - Next: Lesson 5: Follow my directions

Goal: Children ask **[Excuse me, where is the ___?]** and answer **[It is next to / opposite ___]** in an information-gap pair game, each partner holding a map with only some of the places labelled.

Length: about 30 minutes.

Materials

- The word card.
- **Pair-game sheets per pair.** Both sheets show the Little Hill map: roads, the START star, the river and all nine boxes.
  - **Sheet A:** five boxes labelled with name and sign: bakery, library, toy shop, park, bridge. The post office, market, café and pond boxes are empty.
  - **Sheet B:** four boxes labelled: post office, market, café, pond. The bakery, library, toy shop, park and bridge boxes are empty.
- **Answer strips per pair.** Each line shows the sign of a place, a small drawing of the next to or opposite gesture, and the sign of the other place, with the words written under them.
  - **Strip B** (used by child B when answering): post office, opposite the bakery; market, next to the library; café, opposite the toy shop (or next to the park); pond, next to the bridge.
  - **Strip A** (used by child A when answering): bakery, opposite the post office; library, next to the market; toy shop, opposite the café; park, next to the café; bridge, next to the pond.
  - The teacher keeps the strips and hands each one out only for the round in which that child answers (see the teacher notes).
- A folder or book per pair to stand up as a screen.
- A pencil per child.
- Small place cards: one set of nine per pair, to put in the empty boxes instead of drawing.
- The large Little Hill map, kept hidden until the closing check.
- Tick and cross cards (one of each per child).
- Paper for children who want to draw.
- A lap tray for a child in a wheelchair, if needed.
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: the tactile Little Hill map and tactile place cards (see Differentiation); large-print sheets and strips.

Steps

✎ Opening (3 min)

Greeting chant. Teach **[Excuse me]** (a small raised hand) and review **[Thank you]** from The Market (a nod and a smile). Say **[Excuse me, where is the bridge?]** with the gestures;

children copy the gestures and may say it with you. Then show **[next to]** and **[opposite]** once more; children do the gestures.

Warm-up: half a map each (7 min)

1. In the school language: "Today each of you has half of the Little Hill map. Some boxes have a name, and some are empty. To fill the empty boxes, you ask your partner."
2. Show a sheet A: point to the labelled boxes and the empty ones. "When you know where a place is, put its small card in the box, or write or draw it." Show a strip: "When it is your turn to answer, you get a strip. It tells you the answers."
3. **Model it (4 min).** Give a volunteer sheet B and strip B, behind a screen. The teacher (with sheet A) asks **[Excuse me, where is the post office?]** The volunteer finds the post office line on the strip and answers **[It is opposite the bakery]**, or just **[opposite the bakery]**, or shows the opposite gesture and points to the bakery sign on the strip. The teacher finds the bakery on sheet A, puts the post office card in the box across the road, and says **[Thank you]**. Say: "Everyone will still ask about the post office in the game."

✎ Main activity: the pair game (12 min)

1. **Round 1 (5 min).** Partners sit with a screen between them. Give out strip B only. Child A asks about each empty box on sheet A: the post office, the market, the café and the pond. Child B answers from strip B, and A puts the small card in the box (or writes or draws). Collect strip B.
2. **Round 2 (5 min).** Give out strip A. Child B asks about the bakery, the library, the toy shop, the park and the bridge. Child A answers from strip A, and B fills the boxes. Collect strip A. Asking can be the whole question, just **[Where is the ___?]**, or holding up the small place card with the questioning face. Answers can be words, the gesture with a point to the sign on the strip, or both.
3. **Compare (2 min).** Partners take the screen away and put their sheets side by side. Every box should now have the same place on both sheets. Fix any that differ by asking again.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Why did you need to ask your partner?" (Because only your partner's strip had those answers.)
- "Child B, how did you know which box was the park and which was the toy shop?" (The park is **next to** the café, on the same side. The toy shop is **opposite** the café, across the road.)
- "Is anyone really lost in Little Hill?" (No. It is a made-up town. In real life, if you are lost, you ask a grown-up you trust, like a teacher or a police officer.)

✓ Closing check (with answers) (5 min)

Show the large Little Hill map. Children answer by pointing to their sheet, with the gestures, a tick or cross card, or words:

1. **[Excuse me, where is the café?]**
2. **[Where is the pond?]**
3. Point to the bakery: **[Is the bakery next to the post office?]**
4. **[Where is the market?]**

Answers: opposite the toy shop, or next to the park (both are right); next to the bridge; no (cross), it is opposite; next to the library.

Vocabulary

New: **[Excuse me]**, **[Excuse me, where is the ___?]**. Review: **[Thank you]** (from The Market), **[next to]**, **[opposite]**, **[It is next to / opposite ___]**, the nine place names, **[Where is the ___?]**, **[yes]**, **[no]**.

Differentiation

- **Support:** the child asks about only two places in their round; the partner may show the strip line after answering.
- **Stretch:** the child asks every question with **[Excuse me]** and says **[Thank you]** after each answer, and answers in full sentences. Or, in round 2, child A answers from the finished sheet A instead of strip A.
- **Blind or low-vision children:** the child uses the tactile Little Hill map, with the tactile place cards for their own sheet's labelled places already in their boxes, and the other tactile place cards in a row on the desk. Guide the child's hand along the roads once before the game. When answering, an adult reads the strip line quietly to the child. When asking, the child puts the tactile place card in the box their partner describes. Low-vision children use large-print sheets and strips.

⚠ Safety

- Pencils are used at desks and collected at the end.
- Tactile items with pasta or beans are used only after checking for allergies; cards and tactile items are not put in mouths.

Teacher notes and misconceptions

- **Why the strips are handed out one at a time:** next to and opposite work both ways, so each strip also tells its holder where their own missing places are (strip A says the library is next to the market). Give out strip B only for round 1, and collect it before round 2; give out strip A only for round 2. That keeps the gap real.
- Do not let children look over the screen, and keep the large map hidden until the closing check. The large place cards on the walls do not show positions and can stay up.

- Each answer names a place the asker already has on their sheet, so every empty box can be found from one answer.
- For the café, both **[opposite the toy shop]** and **[next to the park]** are right. Child A has both the toy shop and the park on sheet A, so either answer would work; strip B gives "opposite the toy shop" to keep it simple, and in the closing check either answer counts.
- If a child says **[It is near the ___]** or points vaguely, ask: **[Next to? Opposite?]** with both gestures.

Lesson 5: Follow my directions

Unit overview - Previous: Lesson 4: Excuse me, where is the café? (pair game)

Goal: Children move the token along a two- or three-step route on the Little Hill map when they hear it, say what is **[on the left]** or **[on the right]**, and, as a stretch, give a route to a partner. The one-to-one check starts this week.

Length: about 30 minutes (the one-to-one check is spread over the week).

Materials

- The word card.
- The large Little Hill map, on show.
- Pair maps with all nine places labelled: one per pair.
- Tokens: one per pair, plus the check token for the teacher to show on the large map.
- Small arrow cards: one set of four per child.
- Wristband stickers or loose paper wristbands (latex-free), for children who want one again.
- **Route strips:** one set of seven per pair, each a strip of card with picture steps (an up arrow means **[Go straight on]**, a left or right arrow means **[Turn left]** or **[Turn right]**, a hand and a place sign mean **[Stop at the ___]**):
    1. up arrow; hand and loaf (bakery)
    2. up arrow; left arrow; hand and open book (library)
    3. up arrow; left arrow; hand and apple basket (market)
    4. up arrow; right arrow; hand and cup (café)
    5. up arrow; right arrow; hand and tree (park)
    6. up arrow; up arrow; hand and duck (pond)
    7. up arrow; up arrow; hand and arch (bridge)
- Check things (for the one-to-one check): one token, one crossroads card, six small place cards (bakery, post office, library, café, park, bridge), a pair map with all nine places labelled, and the record sheet.
- Tick and cross cards (one of each per child).
- Paper and pencils for children who want to draw or write.
- A lap tray for a child in a wheelchair, if needed.
- Ear defenders and a quiet spot.
- Optional, for blind or low-vision children: the tactile Little Hill map, tactile token, tactile arrow cards, tactile place cards, tactile route strips and, for the one-to-one check, the tactile crossroads card (the same steps as raised arrows and a raised hand, with the tactile sign glued at the end); large-print pair maps and route strips.

Steps

✎ Opening (3 min)

Greeting chant. Say **[left]**, **[right]**, **[straight on]** and **[stop]** in a mixed order; children hold up the small arrow card. Then say **[Turn left]** and **[Turn right]**; children do the arm sweep.

Warm-up: on the left, on the right (7 min)

1. **Model it (3 min).** Put the check token on the START star of the large map, pointing up. Say **[Go straight on. Stop at the bakery.]** and move it. Pat the left side of a desk: **[The bakery is on the left.]** Pat the right side: **[The post office is on the right.]** Children copy the pats.
2. **Pairs (4 min).** Each pair puts its token on START on its pair map, pointing up. Say **[Go straight on. Stop at the bakery.]** Ask **[What is on the right?]**; children pat the side and point (the post office). Back to START. Say **[Go straight on. Go straight on. Stop at the pond.]** Ask **[Is the pond on the left?]** (yes: children hold up the tick card).

✎ Main activity: follow my directions (12 min)

1. **Follow the route (5 min).** Say each route slowly, twice. Pairs take turns moving the token from START; the partner checks. After each one, show it on the large map with the check token.
    - **[Go straight on. Turn right. Stop at the café.]**
    - **[Go straight on. Turn left. Stop at the library.]**
    - **[Go straight on. Turn right. Stop at the park.]**
    - **[Go straight on. Go straight on. Stop at the bridge.]**
    - **[Go straight on. Turn left. Stop at the market.]**
2. **Mystery places (2 min).** Say a route, then a question instead of a place name. Children move the token, then point to the answer:
    - **[Go straight on. Go straight on. Stop at the bridge. What is on the left?]** (the pond)
    - **[Go straight on. Turn right. Stop at the café. What is opposite?]** (the toy shop)
3. **Your turn to lead (5 min).** Each pair puts its route strips face down. One child picks a strip and gives the route: by saying it, by showing the picture steps one at a time with the gestures, or both. The partner moves the token, then turns the strip over to check the place sign. Swap after each strip. Giving a route in words is a stretch; showing the strip counts.

✓ Discussion questions (with answers) (3 min)

In the school language:

- "Which routes have no turn?" (To the bakery, the pond and the bridge: only **[Go straight on]**.)
- "After **[Turn right]**, is the café on the left or the right?" (On the left. The toy shop is on the right.)
- "Did anyone's token turn the wrong way? What helped?" (The wristband sticker, the token's point, or turning the map. Everyone makes wrong turns sometimes.)

✓ Closing check (with answers) (5 min)

Children move the token on their pair map and point to where it stops, or pat the side of the desk:

1. **[Go straight on. Turn left. Stop at the market.]**
2. **[Go straight on. Stop at the bakery. What is on the right?]**
3. **[Go straight on. Turn right. Stop at the park.]**

Answers: the token is at the market, at the left end of Main Street; the post office (on the right); the token is at the park, at the right end of Main Street.

Tell the children: "This week I will play a short game with each of you, one at a time." Over the week, do the five-part check from the unit overview (about 3 minutes per child) while the others play the pair game from lesson 4 or the route strips again.

Vocabulary

New: **[on the left]**, **[on the right]**, **[Stop at the ___]**, **[What is on the left / right?]**. Review: **[Go straight on]**, **[Turn left]**, **[Turn right]**, **[stop]**, **[next to]**, **[opposite]**, the nine place names, **[yes]**, **[no]**.

Differentiation

- **Support:** use only the routes with no turn first (bakery, pond, bridge), then add one turn. The partner may move the token first while the child watches, then the child does the same.
- **Stretch:** the child gives routes from the strips in full sentences, or makes up a route to a place and says it for the partner without a strip. Or, after the token stops, the child says what is **[on the left]** and **[on the right]**.
- **Blind or low-vision children:** before the routes, guide the child's hand along the string roads of the tactile map from the raised star. The child moves the tactile token (feeling its ridge to know which way it points) and uses tactile route strips. In the mystery places, the child touches the tactile place card. Low-vision children use large-print pair maps and route strips.

⚠ Safety

- Tokens, strips and tactile items are not put in mouths; tactile items with pasta or beans are used only after checking for allergies.
- Pencils are used at desks and collected at the end.

Teacher notes and misconceptions

- After **[Turn left]**, the token points left (west), so the top side of Main Street (the library and the market) is on **its right**. After **[Turn right]**, the top side (the café and the park) is on its left. Children do not need to explain this; let them turn the map if it helps.
- Small slips in how far the token moves do not matter. The turns and the place where it stops do.

- Routes are only on the Little Hill map. **Never ask** children to give or draw the way to their home, to school or to any real place. If a child volunteers one, thank them and move back to Little Hill.
- In the check, mixing up left and right is recorded as it happened; if the child fixes it using the wristband sticker, that is **with help**.