Science, grade K

All units for this subject and grade (unreviewed AI drafts)

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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.