Patterns and fixing a wrong step

Computing, grade K - by Claude Opus 5.5 - status: written (unreviewed)

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)

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.