

Growing patterns: predict the next ones

CURRICULUM ALIGNMENT

ALG.PRR.3a

identify rules that describe the structure of a pattern and use these rules to make predictions.

INTERACTIVES

Pattern Blocks · display

Number Line · challenge, explore

WHAT THIS LESSON TEACHES

A growing pattern adds the same number of pieces at every new stage. Once you know the step you can predict the next counts by adding that step each time.

→ 1, 3, 5, 7 grows by adding 2 squares each stage

→ If stage 3 has 6 and the step is 2 then stage 4 has 8

MODEL THIS ON THE BOARD

NEXT STAGE ON THE STAIRCASE

- 1 The counts so far are 1, 3, 5.
- 2 Each stage adds 2 more squares than the one before.
- 3 Add the step: $5 + 2 = 7$.
- 4 So the next stage must have 7 squares.

DISCUSSION STARTER

REFLECT

How did counting the extra pieces each time help you predict the next shape?

LESSON ARC

Build the 1, 3, 5 staircase on the IWB and bank pupils' guesses for the next stair before revealing anything. Grow three patterns stage by stage — triangles (step 1), an L (step 2), and a 3, 6, 9, 12 run — pausing each time so pupils name the constant jump. The Try It Together pivots to equal jumps on the number line. Pupils draw a step-of-2 pattern in their copy and predict stage 4, then the Class Challenge bank consolidates dragging the next count onto the line.

TEACHING MOVES

1. **Getting Started.** Build the 1, 3, 5 staircase as pupils settle, then take three or four guesses for the next stair and write each on the board WITHOUT marking any right. If a pupil says 'two more each time', revoice it as a question: 'so do you think it always goes up by the same amount?'
2. **Watch and Notice.** Build each pattern stage by stage on the one grid — never reveal the finished shape. After every stage pause and ask 'what do you notice?' Write the counts (2, 4, 6, 8) underneath and ask for the jump. Only after all three patterns say the pay-off sentence: 'each stage gets bigger by the same amount — that's the step.'
3. **Try It Together.** Mark 2, 4, 6 as equal jumps from 0 on the number-line interactive, then send a pupil to the board to place the next count (8). Keep returning to one checking question: 'is every jump along the line the same size?' That equal jump IS the step they just named.
4. **Draw the Pattern in Your Copy.** Walk the room and glance for stages that don't add exactly two. If a pupil's stage-4 count is off, prompt with 'how much does it grow each time?' rather than handing them the number — let the step do the work.

5. **Class Challenge.** Keep it brisk. Before each pupil drags the marker, have them say the step out loud, then press Check and let the class confirm. Use 'is every jump the same size?' to catch uneven counters. Save the further-along challenge for a strong pupil.
6. **What Did We Notice?.** Listen for 'the step lets me predict ahead without drawing'. Revoice a strong one: 'so once you know it grows by two, you never draw the next stair — you just add two.' If a pupil stalls, point back to Pattern B: they knew stage 5 had 10 without building it.

COMMON MISCONCEPTIONS

⚠ Pupils read 2, 4, 6, 8 and predict 10 correctly, but for 1, 3, 5 they guess 6 — they expect every pattern to step by 2 because the last one did.

Stop and rebuild the 1, 3, 5 staircase beside the 2, 4, 6 pattern. Ask the pupil to count the jump in THIS pattern, out loud, before predicting. The step is found from the pattern in front of you, not carried over from the last one.

⚠ On the number line a pupil places the next count by guessing a spot rather than copying the jump size — so 2, 4, 6 lands the next mark at 7 or 9.

Have them measure the gap from 4 to 6 with their fingers and slide that exact gap up from 6. 'Every jump is the same size.' The equal jump is the step made visible.

DIFFERENTIATION

EMERGING

- Stay on Pattern A's step of 1 on the number line while the class moves to steps of 2 and 3 — predicting 'one more' first.
- In the copybook, give the squares pre-counted (2, then 4, then 6 already written) so the pupil only has to draw the squares and find stage 4.

DEVELOPING

- After the copybook task, ask for stage 6 of the step-of-2 pattern without drawing stages 4 and 5 — push them to add twice in their head.
- Hand them a pattern starting at 5 (5, 8, 11) so the step isn't a count they already know — does the same checking question still work?

PROFICIENT

- At the board during the Class Challenge, narrate a harder variant: 'this one grows by 4 each time and stage 3 is 14 — what's stage 1?' Working backwards from the step.
- Pose: a pattern grows by the same step and stage 2 is 7, stage 4 is 13. What's the step, and what's stage 1? Have them explain how they know.

✂ **Cross-curricular:** Tie to PE — pupils do a long-jump and chalk equal step-marks along the yard, checking each jump is the same size like the number-line jumps.

ANSWER KEY

Scaffold: visual check on the page

Q1: 17

Q2: 12

Q3: 8

a) Always : That equal step is the rule that makes the pattern grow steadily.

b) Sometimes : True for 2, 4, 6; false for 1, 3, 5.

c) Always : You simply add the step to the last count you already know.

d) Never : A step of zero would stay the same size, so it would not be growing.

EXTENSION SHEET · STRETCH ANSWERS

S1: 45

Investigation: What does the 10th look like? — opened; scan pupils' working for valid solution paths rather than a single answer.