

Design a class garden bed

CURRICULUM ALIGNMENT

MEA.MSR.4a

determine and calculate units of measurement in fractional and/or decimal form to solve practical problems.

INTERACTIVES Shape Measurer · challenge, display, explore

WHAT THIS LESSON TEACHES

When you design a class garden bed you work out three measures. Perimeter is the timber edging all the way round, found by adding every side. Area is the growing space (length times width) and volume is the soil needed (area times depth).

→ A 2 m by 3 m bed needs $2 + 3 + 2 + 3 = 10$ m of edging.

→ A 2 m by 3 m bed 0.3 m deep needs $2 \times 3 \times 0.3 = 1.8$ m³ of soil.

MODEL THIS ON THE BOARD

DESIGN A 2 M BY 3 M BED

- 1 Find the edging. Add all four sides: $2 + 3 + 2 + 3 = 10$ m of timber.
- 2 Find the growing space. Multiply length by width: $2 \times 3 = 6$ m².
- 3 Find the soil. Multiply the area by depth 0.3 m: $6 \times 0.3 = 1.8$ m³.

LESSON ARC

Open on the corner of the school grounds and ask what three things you'd measure before building a 2 m × 3 m bed — fish for perimeter, area and soil. On the shape-measurer interactive, work all three live, then draw the L-split line yourself. Try It Together builds a 4 m × 2 m bed and stretches it. Pupils sketch and label their own bed in copybook, then the Class Challenge proves rectangle and L-shaped designs one at a time.

TEACHING MOVES

1. **Getting Started.** Take three or four hands, not open call-outs. You're fishing for edging, growing space and soil — but hold the words 'perimeter', 'area' and 'volume' back. Let pupils name them their own way first; you'll pin the vocabulary in Watch and Notice.
2. **Watch and Notice.** Work all three live on the shape-measurer interactive — don't narrate a paragraph over each. Point to the edge and add the four sides aloud, then multiply for the inside, holding out for the units each time. The depth is the new wrinkle: ask what changes now it's a box, not a flat shape. For the L, draw the split line down over the display yourself — the interactive shows the shape but won't cut it.
3. **Try It Together.** Pupils take turns at the board; the class agrees or corrects aloud. Before you stretch the bed from 4 m × 2 m to 5 m × 2 m, ask the class to predict what happens to each number. Watch for pupils reading the area figure but dropping the m² — that's the slip to catch here.
4. **Sketch Your Bed in Your Copy.** Walk the row glancing at two things: is every side labelled, and does each answer line carry its unit (m, m², m³)? The frequent slip is a missing or wrong unit, not wrong arithmetic. This is copybook practice, not marking.
5. **Class Challenge.** Brisk practice round — pupils take turns, check each answer, class confirms before moving on. Don't re-explain each design. The first two rectangles are the way in; for the L, draw the split line since the interactive won't. Every design ends with three answers, each carrying its unit.

6. What Did We Notice?. Listen for pupils separating the three jobs — timber, plants, bags of soil. Revoice a strong answer: 'three questions, three units.' Head off the area/volume muddle by asking which measure changes when the bed gets deeper but stays the same size on the ground.

COMMON MISCONCEPTIONS

⚠ Pupils read the area figure out loud as a bare number — '8' or 'eight' — and write it with no unit, or reuse 'metres' for all three answers.

Stop on the spot and point back to the interactive: the edge is metres, the flat space is square metres, the filled box is cubic metres. Have the pupil re-read their answer line with the unit attached out loud before moving on.

⚠ Pupils treat the deeper bed as having more area — they think making it 0.3 m deep changes the growing space, muddling area and volume.

Ask directly: 'the bed is still 2 m by 3 m on the ground — did the growing space change?' Show on the solid view that the floor stays 6 m² while only the soil (volume) grows with depth. Two different questions.

⚠ On the L-shape, pupils try to read one area for the whole odd shape and stall, or add the two rectangle areas but forget the two edging lengths overlap.

Draw the split line yourself so the L becomes two plain rectangles. Read length × width for each, then add. For edging, trace the outside boundary with your finger so pupils count only the outer sides.

DIFFERENTIATION

EMERGING

- Keep these pupils on plain rectangles for the whole Class Challenge — the L-shape is not the target for them. Give them the 3 m × 2 m and 4 m × 3 m beds and support the soil step.
- Pre-label the depth as 0.3 m on their copybook sketch so the only new work is area × depth, not remembering the figure.

DEVELOPING

- After the copybook sketch, ask them to double one side of their bed and work out which of the three measures doubles and which don't — then explain why.
- On the 4 m × 3 m bed, ask how many bags of soil at, say, 0.4 m³ a bag they'd order — a division follow-on from the volume answer.

PROFICIENT

- Hand them the 12 m² L-shape stretch and push for a second correct answer, then ask: which of your two L-shapes needs less edging, and why? Pair with a copybook moment.
- Pose from the front: 'Can two beds with the same area need different amounts of edging?' Let them investigate on squared paper and predict the rule before the class discusses it.

✓ **Cross-curricular:** Tie to the science strand — pupils plan which vegetables fit their bed by spacing, using the growing-space figure to work out how many plants the area holds.

ANSWER KEY

c) 14 m

Q1: 16 m

Q2: 10 m²

Q3: 18 m

Q4: 15 m²

a) **Always** : Adding the four sides 2 + 3 + 2 + 3 always gives 10 m of edging.

b) **Never** : Growing space is area, found by multiplying length by width, not by adding sides.

c) **Always** : 4 + 2 + 4 + 2 equals 12 m every time.

d) **Never** : Perimeter is a length in metres; soil volume is in cubic metres.

EXTENSION SHEET · STRETCH ANSWERS

S1: 189 m²

S2: 792 cm³

S3: 106 m

S4: 20 cm²

S5: 30 cm^2