Lesson 88 SHAPE & SPACE

Scale drawings and scale maps — small drawings of big things

CURRICULUM ALIGNMENT

SHA.SAL.4b interpret scale maps and create simple scale drawings.

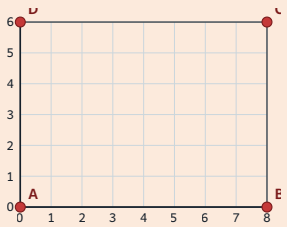
NUM.FRC.4b investigate proportionality and ratios of quantities (sets).

INTERACTIVES Coordinate Grid · challenge, display, explore

WHAT THIS LESSON TEACHES

A **scale** tells us how many real units one paper unit stands for. A **1:100** scale means 1 cm on the page represents 100 cm (= 1 m) in real life. To convert: multiply the paper measurement by the scale's right-hand number.

- → **1:100** plan, line **5 cm** long → real length = 5 × 100 = **500 cm = 5 m**.
- → **1:50,000** OS map, two points **3 cm** apart → real distance = 3 × 50,000 = 150,000 cm = **1.5 km**.
- → Drawing a room **8 m × 6 m** at **1:100** → paper rectangle **8 cm × 6 cm** (the ABCD grid above).



MODEL THIS ON THE BOARD

CLASSROOM IS 8 M × 6 M — DRAW IT AT 1:100 SCALE

1. **1:100** means 1 cm on paper = 100 cm (1 m) in real life.
2. 8 m → paper length = 8 × 1 cm = **8 cm**.
3. 6 m → paper width = 6 × 1 cm = **6 cm**.
4. Draw the rectangle **8 cm × 6 cm**. Label the scale (1:100) above it.

LESSON ARC

Open with a park map on the IWB and a tree-to-tree guess to motivate the little ruler in the corner. Walk three worked plans — classroom at 1:100, treasure route at 1:1000, and one more — naming the scale aloud and matching centimetres to metres. Pupils sketch their own desk-top at 1:10 in copybook, then pair off into the corridor with a metre stick to measure and convert two real lengths. Class Challenge plots four rooms on the grid, finishing with a 1:200 stretch.

TEACHING MOVES

1. **Getting Started.** Take three hands-up guesses for the tree distance and write them on the board — don't reveal the answer. Point silently at the little ruler in the map corner: 'that's our clue, and reading it is today's job.'
2. **Watch and Notice.** Spend two to three minutes per plan, saying the scale aloud as 'one to one hundred', then counting centimetres against metres so the match is visible. On the treasure-map plan, pause and ask 'why is 40 m only 4 cm here when the same 40 m would be 40 cm on the classroom plan?' — the right-hand number does the squeezing.

3. **Try It Together.** Rotate four pupils through the four corners of the classroom plan, A at (0,0) in the south-west. On the second corner pause and ask 'how do we know it goes there?' — push for 'six metres wide, so six centimetres at 1:100.' This round is talk-it-through; no marking yet.
4. **Sketch the Plan in Your Copy.** Walk the row glancing at two things only: is 'Scale 1:10' written above the drawing, and is the real length labelled alongside the paper length on every side? If a pupil has drawn the full 60 cm, ask 'how many centimetres should that be on a 1:10 plan?' and let them correct.
5. **Out to Measure and Convert.** Pair pupils at the door before leaving — two minutes out, eight or nine to measure, two back. One holds the metre stick, the other walks to its end and marks the next metre. Insist on the scale label at the top of each sketch before they move to the second measurement; the slip is writing '4 m' inside the 4 cm rectangle and forgetting '1:100'.
6. **Class Challenge.** Run the first two rectangles briskly. Pause on the L-shape so the class walks the perimeter together in order without the line crossing itself. On the 1:200 stretch, revoice before the pupil plots: 'real divided by the right-hand number — sixteen divided by two is eight.' Direct fast finishers to the extension bank on a device while you circulate.
7. **What Did We Notice?.** Listen for pupils naming the inverse pattern. Revoice clearly: 'the right-hand number tells us how many metres are packed into one centimetre, and the more we pack in, the smaller the drawing.' Use the road-atlas question to point forward — Ireland won't fit at 1:100.

COMMON MISCONCEPTIONS

⚠ Pupils read 1:100 as 'one centimetre equals one hundred centimetres' and then write 100 cm on the plan instead of 1 cm — technically the conversion is right but the units sabotage them.

Stop the class and say 'one hundred centimetres is the same as one metre, so the plan stays at 1 cm.' Re-count along the classroom plan with the metre stick beside the IWB ruler — one metre on the stick, one centimetre on the screen.

⚠ Pupils forget to divide on a 'real to paper' problem — on the 1:200 stretch they plot 16 cm for a 16 m wall instead of 8 cm.

Before they plot, ask 'what's the right-hand number?' then 'so what do we do with the sixteen?' Write the calculation 16 ÷ 2 = 8 on the board beside the prompt so the rule is visible while they draw.

⚠ Pupils write the real length inside their paper rectangle (e.g. '4 m' inside a 4 cm box) and leave the scale off the page entirely.

Insist on the scale label at the top of every sketch before they walk on. Quick question at the desk: 'where on the line does it say what the real wall measures, and where does it say the scale?'

DIFFERENTIATION

EMERGING

- Stay at 1:100 only — every metre becomes one centimetre, no division needed. Skip the 1:10 desk sketch and pre-print a grid with the room outline started.
- Pair with a confident partner for the corridor task; the emerging pupil holds the metre stick while the partner records, then they swap on the second length.

DEVELOPING

- After the L-shape challenge, ask 'what would this same room look like at 1:50? Bigger or smaller, and by how much?' Pupils sketch one wall to check.
- Pose a missing-scale puzzle: a 7 m wall is drawn as 7 cm on the page — what scale was used? Then change the paper length to 3.5 cm and ask again.

PROFICIENT

- Direct fast finishers to the extension bank on their device while you circulate. After that, pose: 'design a scale for a plan of the whole school yard that fits on one A4 page — justify your choice.'

Cross-curricular: Tie to Geography — pupils find the scale bar on an Ordnance Survey Ireland map of their townland and work out a real distance between two named features.

ANSWER KEY

W1: 1 m

W2: 1.2 m

Q1: 4.5 m

Q2: 30 m

Q3: 25 m

Q4: 9 units