TEACHER RESOURCE BOOK · MATHS · 5TH CLASS

Lesson 88 SHAPE & SPACE

# Scale drawings and scale maps — small drawings of big things

## CURRICULUM ALIGNMENT

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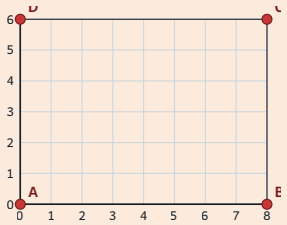
| SHA.SAL.4b | interpret scale maps and create simple scale drawings. |
| NUM.FRC.4b | investigate proportionality and ratios of quantities (sets). |
| MEA.MSR.4a | determine and calculate units of measurement in fractional and/or decimal form to solve practical problems. |

## 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 the park-map image — point to the scale bar and ask how it tells real distance without walking it. Sketch a 1:100 classroom plan on the board, labelling paper-cm and real-m, pivoting on 'one cm on the page is one metre on the ground'. The class measures a 6 m × 5 m room and divides aloud to find paper lengths. Pupils sketch the same 1:100 plan in their copy, then measure a real wall with the metre stick before the Student Activity Book.

## TEACHING MOVES

1. **Getting Started.** Display the park map and give five seconds of silent think-time before any hands. Take two or three hands-up answers only — you want the idea that the scale bar links paper distance to real distance, nothing more. Don't resolve the maths yet.
2. **Watch and Notice.** Sketch each plan on the board with both lengths and the ratio labelled. On the 1:100 classroom, pose 'a wall is 4 cm on the plan — how long really?' and take two hands before revealing 4 m. Keep the place-value chat (×100 means two zeros) for the board, not the pupils' screens.
3. **Try It Together.** Work the 6 m × 5 m room out loud, showing the division each time: 6 m = 600 cm, 600 ÷ 100 = 6 cm. Watch for pupils dividing the metres straight away without changing to centimetres first — reconcile that slip aloud as it surfaces.

4. **Sketch a Scale Plan in Your Copy.** Walk the room glancing for two things only: the 1:100 written above the plan, and both units (cm and m) labelled on each side. No individual marking. Catch anyone dropping the real-unit label or skipping the centimetre conversion.
5. **Class Challenge.** Keep the measuring to one wall per group so the minutes hold — one metre stick per group of four or five. They convert real-to-paper and sketch, then read a labelled plan back the other way at their seats by multiplying by 100. Circulate; keep it brisk.
6. **What Did We Notice?.** Listen for the practical reason — a full-size map of Ireland would be the size of Ireland. Revoice a strong answer about keeping every distance in proportion, and head off the idea that scale changes the real distances; it only changes how we draw them.

## COMMON MISCONCEPTIONS

⚠ Pupils take a 6 m wall at 1:100 and write '6 ÷ 100 = 0.06 cm' — they divide the metres without first changing to centimetres.

Stop and write the two lines side by side on the board: 6 m = 600 cm, then 600 ÷ 100 = 6 cm. 'Match the units before you divide.' Have the pupil say the metres-to-centimetres step out loud before the division.

⚠ When asked for the real length from a 4 cm paper line at 1:25, pupils divide instead of multiply — they apply the same operation both directions.

Anchor the direction: 'paper is smaller, so going to real we make it bigger — multiply.' Walk 4 × 25 = 100 cm = 1 m, then contrast with a real-to-paper sum on the same board so the two directions sit next to each other.

## DIFFERENTIATION

### EMERGING

- Give these pupils a wall already stated in centimetres (e.g. 400 cm) so the only step is ÷ 100, removing the metres-to-cm conversion until the division is secure.
- Pre-draw the plan rectangle in their copy so they label paper-cm and real-m onto an existing shape rather than judging the sketch proportions too.

### DEVELOPING

- After the Class Challenge, hand them the same wall at 1:50 and ask which paper length is bigger and why — same wall, halved scale number.
- Pose a missing-number version: a 7 cm paper line stands for a 7 m wall — what scale is this plan drawn at?

### PROFICIENT

- Set the 4 cm × 3 cm rectangle at 1:25 and ask for the real perimeter only — narrate that length scales by the ratio, and challenge them to predict (not calculate) what happens to area, banking it for later.
- Pull them ahead into the Student Activity Book page and ask them to write a one-line rule a younger pupil could follow for choosing divide or multiply.

**Cross-curricular:** Tie to Geography — read the scale on an Ordnance Survey map of the local area and work out the real distance between two named places.

## ANSWER KEY

**W1:** 1 m

**W2:** 1.2 m

**Q1:** 4.5 m

**Q2:** 30 m

**Q3:** 25 m

**Q4:** 9 units