Lesson 90 SHAPE & SPACE

Interpreting scale maps and distances

CURRICULUM ALIGNMENT

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

MEA.MSR.4b find, interpret and deduce measures experimentally with increasing precision.

WHAT THIS LESSON TEACHES

A scale on a map shows how a short distance on the paper stands for a real distance on the ground. With the scale 1 cm = 2 km, multiply the centimetres measured by 2 to find the real kilometres.

→ On a map of County Kerry, 3 cm between towns means 3 times 2 = 6 km really.

→ A 4.5 cm road on the Wild Atlantic Way map is 4.5 times 2 = 9 km on the ground.

MODEL THIS ON THE BOARD

USING THE SCALE TO FIND REAL DISTANCE

1. Measure the distance on the map in centimetres.
2. Multiply that number by 2 because each centimetre stands for 2 km.
3. Write the answer in kilometres.

LESSON ARC

Open on the IWB map: two towns 3 cm apart on a 1 cm = 2 km scale — take the paper-equals-real slip without correcting it yet. Work four board examples live, pivoting on the 4.5 cm case where the half-centimetre must be multiplied too, and the scale-swap that shows 6 cm means different real distances. Pupils then measure three routes on the printed map, record the multiplications in their copy, and move to the Student Activity Book for solo measure-and-convert practice.

TEACHING MOVES

1. **Getting Started.** Take three hands-up answers, not open call-outs, and do not confirm any of them. Listen hard for '3 km' — that's the paper-equals-real slip the whole lesson exists to fix. Hold it: 'we'll check that together.'
2. **Watch and Notice.** Work all four boards live, not as a script. On the 4.5 cm case, pause and point: 'the half-centimetre is worth 1 km here — it gets multiplied too.' When the scale swaps to 1 cm = 500 m, put the two 6 cm results side by side so the class sees the same paper length give very different real distances. On the reverse board, draw out that dividing undoes the multiplying.
3. **Try It Together.** Circulate while pupils measure the three routes at their desks. Catch two slips on the spot: rulers lined up from the 1 cm mark instead of 0 (adds a phantom kilometre), and pupils who measure 4.5 cm but convert only the whole 4. Reconcile the three answers on the board as you go — 6 km, 9 km, 13 km.
4. **Record Your Measurements in Your Copy.** Glance down the rows for the scale written at the top and the multiplication shown on each line, not just the answer. This is copybook practice, not marking — keep moving.
5. **Class Challenge.** Brisk turn-taking: a pupil reads the measurement aloud, the class confirms the multiplication, everyone checks before the next. On the final 15 km problem, expect pupils to multiply again — ask 'if 1 cm is worth 2 km, how many centimetres is 15 km?' rather than re-teaching the whole rule.

6. **What Did We Notice?.** Steer talk back to the scale swap: the same 6 cm meant 12 km on one map, 3 km on another. Revoice a strong answer — 'the centimetres tell you nothing until you know what one centimetre is worth.' Then ask 'if no scale were printed, could you find the real distance at all?'

COMMON MISCONCEPTIONS

⚠ Pupils say the towns 3 cm apart are '3 km' apart — they read the paper distance straight off as the real distance and skip the scale entirely.

Don't correct it at Getting Started — hold it. When you reach the first Watch and Notice board, put 3 cm and its 6 km result on the map together and ask the pupil what one centimetre is worth. The multiplication is the missing step.

⚠ Pupils measure 4.5 cm but convert only the whole 4 cm, dropping the half — they treat the decimal as too fiddly to count.

Rebuild it on the board: on a 1 cm = 2 km map, half a centimetre is worth 1 km, so it has to be multiplied too. 4.5 × 2 = 9, not 8. Have them re-read the ruler to the half-centimetre before converting.

⚠ On the reverse problem (real 15 km → how many cm?), pupils multiply by the scale again out of habit and get 30 cm.

Point back to the reverse board. Ask 'if 1 cm is worth 2 km, how many of those 2-km pieces fit into 15 km?' Divide, don't multiply: 15 ÷ 2 = 7.5 cm.

DIFFERENTIATION

EMERGING

- Stay on the 1 cm = 2 km scale only and keep to whole-centimetre routes so the multiply-by-2 is clean before half-centimetres come in.
- Pre-mark the 0 end of the ruler with a coloured dot so pupils line up from zero, not the 1 cm mark.

DEVELOPING

- After the copybook lines, ask pupils to find two routes on the map that differ by exactly 2 km and prove it with their measurements.
- Give a mixed reverse-and-forward pair: '8 km is how many cm? A 5 cm road is how many km?' — same scale, both directions back to back.

PROFICIENT

- Narrate a harder variant at the board: hand fast finishers the printed map re-labelled 1 cm = 500 m and ask them to re-convert the coast path they already measured — same paper length, what changes and why?
- Pull them ahead into the Student Activity Book measure-and-convert page while the class finishes the Class Challenge.

↗ **Cross-curricular:** Tie to Geography — use an OS-style map of the local area or the Wild Atlantic Way and measure a real route pupils know between two towns.

ANSWER KEY

a) 3 cm = 6 km

b) 4.5 cm = 9 km; 7.5 cm = 15 km

c) 7.5 cm

Q1: 6 km

Q2: 4 km

Q3: 8 km

Q4: 9 km

Q5: 15 km

Q6: 7.5 cm

a) Always — Multiplying 5 by 2 always gives 10.

b) Never — You always multiply by 2, never divide, for this scale.

c) Always — That is exactly what the scale states.

d) Sometimes — Some distances like 4.5 cm require half centimetres.