

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 $1 \text{ cm} = 2 \text{ km}$, multiply the centimetres measured by 2 to find the real kilometres.

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

→ A 4.5 cm road on the Wild Atlantic Way map is 4.5 times $2 = 9 \text{ km}$ 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 Ireland map with the scale $1 \text{ cm} = 2 \text{ km}$ and two towns 3 cm apart — take three hands-up guesses without confirming. Work four live board examples: multiply by the scale, keep the half-centimetre, switch scales, then reverse real km into map cm. Pupils measure three marked routes on the printed scale map with rulers and record each multiplication in their copybooks. Class Challenge banks the same conversions plus a reverse. Student Activity Book is the independent measure-and-convert practice.

TEACHING MOVES

1. **Getting Started.** Show the map and the scale $1 \text{ cm} = 2 \text{ km}$. Ask how far apart the two towns really are if they sit 3 cm on the paper. Take three hands-up answers only — do not confirm. Hold any '3 km' reply with 'we'll check that together'; the whole lesson pivots on paper distance not equalling real distance.
2. **Watch and Notice.** Work each of the four examples live on the board, not as a script. After $3 \text{ cm} \rightarrow 6 \text{ km}$, ask what we multiplied by and why. Pause on $4.5 \text{ cm} \rightarrow 9 \text{ km}$ so the half-centimetre is measured and multiplied too. Contrast 6 cm on $1 \text{ cm} = 500 \text{ m}$ (3 km) with the same 6 cm on the 2 km scale. Finish with the reverse: $12 \text{ km} \div 2 = 6 \text{ cm}$. Revoice the rule a pupil offers.
3. **Try It Together.** Hand out the printed scale map ($1 \text{ cm} = 2 \text{ km}$) and rulers. Pupils measure the straight road, river crossing and coast path at their desks to the nearest half-centimetre; circulate and catch alignment slips on the spot. Reconcile on the board as you go: $3.0 \text{ cm} \rightarrow 6 \text{ km}$, $4.5 \text{ cm} \rightarrow 9 \text{ km}$, $6.5 \text{ cm} \rightarrow 13 \text{ km}$. Watch for rulers started at the 1 cm mark and for pupils who drop the half when converting.
4. **Record Your Measurements in Your Copy.** Pupils write the scale $1 \text{ cm} = 2 \text{ km}$ at the top of the copy page, then each line as $\text{map cm} \times 2 = \text{real km}$. Walk the room glancing that the multiplication is shown, not just the answer — this is whole-class copybook practice, not marking.
5. **Class Challenge.** Keep it brisk practice: pupils take turns reading each measurement aloud, the class confirms the multiplication, then move on. On the reverse ($15 \text{ km} \rightarrow \text{map cm}$), stop anyone who multiplies

again — ask ‘if 1 cm is worth 2 km, how many centimetres is 15 km worth?’ Target answer: $15 \div 2 = 7.5$ cm.

6. **What Did We Notice?** Ask why the scale must be checked before trusting a distance, and what goes wrong if two maps of the same place use different scales. Pull back the Watch and Notice contrast: the same 6 cm meant 12 km on one scale and only 3 km on the other. Revoice: ‘the centimetres alone tell you nothing until you know what one centimetre is worth.’ Head off paper-equals-real with ‘if there were no scale, could you find the real distance at all?’

COMMON MISCONCEPTIONS

⚠ Pupils hear ‘3 cm apart on the map’ and answer ‘3 km’ — they treat the paper distance as the real distance.

Hold the answer without shaming it. Point back at the printed scale $1 \text{ cm} = 2 \text{ km}$ and rebuild: each centimetre is worth two kilometres, so three centimetres is 3×2 . Ask what the 3 would mean if the scale were missing.

⚠ Pupils line the ruler up from the 1 cm mark instead of 0, so a true 3 cm road is read as 4 cm and becomes 8 km.

Stop at the desk, place the 0 mark on the start of the route, and re-measure together. Say: ‘starting at 1 adds a phantom centimetre — two phantom kilometres on this map.’

⚠ Pupils measure 4.5 cm correctly but convert only the whole 4 cm, writing 8 km and dropping the half. Revoice on the spot: ‘the half-centimetre is worth 1 km on this map, so it counts too.’ Rewrite $4.5 \times 2 = 9$ km under their line so the decimal is visibly multiplied.

DIFFERENTIATION

EMERGING

- Stay on whole-centimetre routes first (the 3.0 cm straight road) and convert those before tackling 4.5 cm or 6.5 cm.
- Sit with the pupil as they place the ruler: check the 0 mark is on the start point before any reading is written.

DEVELOPING

- After the three routes are recorded, change only the scale to $1 \text{ cm} = 5 \text{ km}$ and ask what the same map centimetres become — same measurements, new multiplications.
- On the reverse item, ask them to justify out loud why we divide rather than multiply before the class moves on.

PROFICIENT

- Stretch the reverse on the board: a real 11 km journey on this map — what map length, and why is the answer not a whole number?
- Fast finishers move ahead into the Student Activity Book measure-and-convert page while the class finishes the last Class Challenge item.

✂ **Cross-curricular:** Tie to Geography — measure a Wild Atlantic Way coastal stretch on a class atlas and convert it using that map’s printed scale.

ANSWER KEY

a) $3 \text{ cm} = 6 \text{ km}$

b) $4.5 \text{ cm} = 9 \text{ km}$; $7.5 \text{ cm} = 15 \text{ km}$

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 : Multiply 5 by 2 to get 10 km every time.

b) Never : You multiply the map distance by 2, not divide.

c) Always : That is exactly what the scale $1 \text{ cm} = 2 \text{ km}$ means.

d) Sometimes : True for 4.5 cm (9 km); false for 4.3 cm (8.6 km).