

Choosing and converting metric units of length

CURRICULUM ALIGNMENT

MEA.MSR.4a

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

NUM.PVT.4

investigate how decimals and percentages (and fractions) can be compared, ordered and expressed in related terms.

INTERACTIVES Unit Converter · challenge, display, explore

WHAT THIS LESSON TEACHES

Millimetres, centimetres, metres and kilometres each suit a different size of object. We pick the unit that gives a sensible-sized number.

→ A pencil suits cm (about 18 cm).

→ A corridor suits m (about 30 m).

MODEL THIS ON THE BOARD

CONVERT 7.3 M TO CM

- 1 Decide direction: from m to cm means going down the ladder so multiply.
- 2 Each metre holds 100 cm so multiply 7.3 by 100.
- 3 7.3 becomes **730** and the decimal point stays put while digits step two places.

LESSON ARC

Open with the absurd pair — corridor as 30,000 mm, pencil as a fraction of a kilometre — and push pupils to name the unit they would actually use. Trace the km–m–cm–mm ladder on the unit-converter interactive with the point fixed and the digits stepping. Class decides multiply or divide before each Try It Together conversion. Copybook writes four real objects two ways with the sensible unit underlined. Class Challenge banks four conversions including the two-jump cm-to-km stretch.

TEACHING MOVES

1. **Getting Started.** Give five seconds of quiet think-time, then take three hands-up answers only. Listen for metres for the corridor and centimetres for the pencil. Revoice: 'we pick the unit that gives a number easy to say and picture' — do not let the class chase the exact pencil-in-km figure.
2. **Watch and Notice.** Trace the ladder first — km, m, cm, mm — saying aloud that the point stays put and the digits move. Point at the digits as 2.5 m becomes 250 cm ($\times 100$, two places) and 1750 mm becomes 1.75 m ($\div 1000$, three places). Spend the extra half-minute on 1200 cm $\rightarrow$ 0.012 km via the two-jump route; Class Challenge needs it.
3. **Try It Together.** Before each conversion ask: 'up the ladder or down — multiply or divide, and by how much?' A different pupil drives the converter each time; remind them to change both start and end units. Watch for the gut slip of only one or two places between mm and m.
4. **Write the Lengths Two Ways in Your Copy.** Walk the room glancing at which unit is underlined and whether the two-unit pair lines up. No marking. For pupils who stall, have them rule km | m | cm | mm columns with $\div 10$, $\div 100$, $\div 1000$ labels as a scaffold.

5. **Class Challenge.** Keep board work brisk — one pupil per conversion, class confirms, move on. On 1250 cm to km, let a confident pupil unpack the two-jump route (cm→m, then m→km) while the watching class calls the next jump aloud before it is solved.
6. **What Did We Notice?.** Probe for the link between places and step size: three places because 1000 mm in a metre, two because 100 cm in a metre. Revoice: 'the digits step one column for every ten, so a thousand means three columns.' Head off any claim that the point itself moves.

COMMON MISCONCEPTIONS

⚠ Pupils shift only one or two places when converting mm to m — '1750 mm is 175 m' or '17.5 m' — treating every rung as the same size.

Stop and rebuild the ladder on the unit-converter: count the zeros in 1000 aloud. 'One zero, one place; three zeros, three places.' Convert 1750 mm again while pointing at each column the digits cross.

⚠ Pupils say 'the decimal point moves' and drag the point across the digits instead of shifting the digits past a fixed point.

Freeze the converter mid-conversion. Point at the fixed point and the digits stepping: 'The point stays. The digits walk past it into new place columns.' Have the class say 'digits move' in unison before the next example.

⚠ Pupils multiply when they should divide going up the ladder — 2.5 m becomes 0.025 cm — because they reverse 'bigger unit means smaller number'.

Ask before the button is pressed: 'Are we going up toward km or down toward mm?' Up the ladder divides; down multiplies. Check the result is a sensible size for the object before accepting it.

DIFFERENTIATION

EMERGING

- Stay on adjacent rungs only (m↔cm, cm↔mm) during Try It Together; hold the two-jump km conversions until the single-step rule is secure.
- In the copybook moment, pre-rule the four unit columns with the ÷10 / ÷100 / ÷1000 labels so pupils place digits rather than invent the ladder.

DEVELOPING

- After the first Class Challenge conversion, ask them to predict 7.3 m to mm before the converter runs — then check.
- On the copybook page, add one more object of their own (shoe length, pitch width) written two ways with the sensible unit underlined.

PROFICIENT

- On the stretch item, reverse the two-jump: start from 0.012 km and recover 1200 cm, explaining each multiply aloud at the board.
- After Class Challenge, pull fast finishers into the Student Activity Book page while the class finishes the last conversion.

✓ **Cross-curricular:** Tie to Geography — convert a nearby Irish town's road-sign km figure into metres, then ask which unit a walker would actually use.

ANSWER KEY

a) 730 cm

b) 4.2 m

c) 620 m

Q1: 730 cm

Q2: 4.2 m

Q3: 3,000 cm

Q4: 620 m

Q5: 0.0125 km

a) **Always** : One metre is exactly 100 centimetres, so the rule is fixed.

b) **Always** : 2500 millimetres equals 2.5 metres exactly.

c) **Never** : A pencil is far too short for kilometres to give a useful number.

d) **Sometimes** : True for a book; false for the length of the room, better in metres, or a staple, better in millimetres.

EXTENSION SHEET · STRETCH ANSWERS

S1: 0.07628 km

S2: 0.05969 km

S3: 3.29 km

S4: 4.95 m

S5: 7.17 m