

Converting capacity units

CURRICULUM ALIGNMENT

MEA.MSR.4a

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

ALG.PRR.4a

identify, explain and apply generalisations, including properties of operations, mathematical models and patterns.

INTERACTIVES Unit Converter · challenge, display, guided

WHAT THIS LESSON TEACHES

A litre (l) is the bigger unit of capacity and a millilitre (ml) is one thousandth of a litre. There are 1,000 ml in 1 l, so multiply by 1,000 to change l to ml and divide by 1,000 to change ml to l.

→ 2 l = 2,000 ml

→ 250 ml = 0.25 l

→ 1.5 l = 1,500 ml

MODEL THIS ON THE BOARD

BOTTLE OF FIZZY WATER

- ① A 1.5 l bottle must be written in ml to match a glass.
- ② Multiply litres by 1,000: $1.5 \times 1,000$.
- ③ The digits slide three places: 1.5 becomes **1,500**.
- ④ So the bottle holds 1,500 ml.

LESSON ARC

Open with a 1.5 l bottle and a 250 ml glass — how many glasses pour out? Surface that you can't compare until both share a unit. Work the conversion ladder live: litres at top, millilitres three steps below, digits sliding left for $\times 1,000$ and right for $\div 1,000$. Pupils convert four in copybook, labelling each arrow. Class Challenge is the practice round; the wrap ties the whole thing back to the kg-to-g rule pupils already know.

TEACHING MOVES

1. **Getting Started.** Hold up the bottle and glass; take two or three hands-up answers only. Don't solve the glasses question — the point is that 1.5 and 250 can't be compared until they share a unit. Leave the litres-vs-ml choice open; it returns at the wrap.
2. **Watch and Notice.** Work each ladder step live — don't read a script. Before revealing $1.5 \text{ l} \rightarrow 1,500 \text{ ml}$, ask what a half-litre is in ml ('five hundred' should come back). At $0.5 \text{ l} \rightarrow 500 \text{ ml}$, flag the disappearing leading zero — pupils sometimes write 5,000. The kg-to-g rule goes on the board now, but hold back the explicit link; you want a pupil to name it at the wrap.
3. **Try It Together.** Pupils take turns tapping the destination rung and watching the digits slide — roughly 2 minutes each across the ten. Get the direction (left/bigger or right/smaller) from the class before each answer appears. Slow right down on $75 \text{ ml} \rightarrow 0.075 \text{ l}$, the two-leading-zeros one, and let the class read it off the ladder before you confirm.

4. **Work the Conversion in Your Copy.** Walk the room glancing at the arrow labels — this is practice, not marking. The arrow label is your live check: watch for pupils labelling $\times 1,000$ when the number should be getting smaller ($1,600 \text{ ml} \rightarrow \text{l}$ and $90 \text{ ml} \rightarrow \text{l}$), and catch it on the spot.
5. **Class Challenge.** Brisk board turns — pupils fill each rung, press Check, class confirms, move on. Before the tricky pair ($3,050 \text{ ml}$ with its internal zero, then the $45 \text{ ml} \rightarrow 0.045 \text{ l}$ stretch), ask the class to predict how many zeros will sit in front of the digits, then Check.
6. **What Did We Notice?.** Listen for a pupil naming that $\text{l} \rightarrow \text{ml}$ and $\text{kg} \rightarrow \text{g}$ are the same three-column $\times 1,000 / \div 1,000$ jump. Revoice it: 'so it's the very same jump — only the units change, not the rule.' If a pupil says the difference is 'one is liquid, one is weight', accept it and add that the maths doesn't care which.

COMMON MISCONCEPTIONS

⚠ Converting 0.5 l , a pupil writes $5,000 \text{ ml}$ — they moved the digits but lost the decimal, treating 0.5 as if it were 5 .

Put 0.5 l and 5 l on the ladder side by side and slide both down three rungs. 5 l gives $5,000 \text{ ml}$; 0.5 l is ten times smaller, so it can only be 500 ml . The leading zero is doing real work — read it aloud.

⚠ Converting 90 ml or $1,600 \text{ ml}$ back to litres, a pupil labels the arrow $\times 1,000$ instead of $\div 1,000$ because the $\times 1,000$ rule is fresh in their head.

Point at the ladder direction: ml sits below l , so going up to litres the number must get smaller. Ask 'is 90 ml more or less than a litre?' — less, so the answer starts $0.\text{something}$, not $90,000$.

⚠ On $75 \text{ ml} \rightarrow 0.075 \text{ l}$, a pupil writes 0.75 l — they slid the digits but only accounted for one place-value gap, not three.

Count the rungs aloud on the ladder together — one, two, three columns right. Have the pupil place each leading zero as they say the column, so all three moves are visible before the final read.

DIFFERENTIATION

EMERGING

- Stay on whole-litre and clean half-litre conversions (2 l , 0.5 l , 3 l) on the ladder while the class moves to decimals with internal zeros. The digit-slide is visible without the extra place-value load.
- Pre-draw the $\text{l} \rightarrow \text{ml}$ arrow in the copybook so pupils choose only $\times 1,000$ or $\div 1,000$, not the whole layout.

DEVELOPING

- After the copybook page, give a comparison: which is more, 0.4 l or 450 ml ? Convert one to match the other and justify.
- Hand back the opening question — how many 250 ml glasses fill the 1.5 l bottle? — and ask them to show the working in ml .

PROFICIENT

- Narrate a three-unit chain at the board: if $1 \text{ l} = 1,000 \text{ ml}$, and later we'll meet cubic centimetres, predict what 1 ml might equal in cm^3 and explain your reasoning before the next lesson confirms it.
- Pull them ahead into the Student Activity Book page and ask them to write a rule, in their own words, that works for both $\text{l} \leftrightarrow \text{ml}$ and $\text{kg} \leftrightarrow \text{g}$.

✓ **Cross-curricular:** Tie to the science strand — pupils read the ml markings on a measuring jug during a water-volume investigation and record the same amount in litres.

ANSWER KEY

Scaffold: visual check on the page

Q1: $4,000 \text{ ml}$

Q2: $3,000 \text{ ml}$

Q3: 0.8 l

Q4: 350 ml

Q5: 1.75 l

Q6: 125 ml

a) Always : By definition there are exactly $1,000 \text{ ml}$ in every litre.

b) Always : The conversion factor is always $\times 1,000$ when going from l to ml .

c) Always : Dividing 750 by $1,000$ always gives 0.75 .

d) Never : $0.4 \times 1,000 = 400 \text{ ml}$, not 40 ml .

EXTENSION SHEET · STRETCH ANSWERS

S1: 4.95 m

S2: 0.382 l

S3: 91.7 cm

S4: 0.981 kg

S5: 7.17 m