

Converting mass units

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, guided

WHAT THIS LESSON TEACHES

One kilogram equals one thousand grams. To change kg into g multiply by 1000 (digits slide three places left); to change g into kg divide by 1000 (digits slide three places right).

→ 2.5 kg = 2500 g

→ 75 g = 0.075 kg

MODEL THIS ON THE BOARD

FLOUR BAG: 2.5 KG TO GRAMS

- 1 Write 2.5 kg on the place-value mat (2 units and 5 tenths).
- 2 Multiply by 1000: slide every digit three places to the left.
- 3 The 2 lands in the thousands column and the 5 lands in the hundreds column.
- 4 Fill the empty ones and tens with zeros to give 2500 g.

LESSON ARC

Open with a 2.5 kg flour-bag label and bank every guess on the board without confirming. Move to the unit-converter ladder interactive and read the $\times 1000$ chip off the screen, saving $75 \text{ g} \rightarrow 0.075 \text{ kg}$ as the tricky $\div 1000$ case. Pupils call the rule direction in unison before each Check, then label $\times 1000 / \div 1000$ arrows in their copybook. The Class Challenge climbs to $6 \text{ g} \rightarrow 0.006 \text{ kg}$.

TEACHING MOVES

1. **Getting Started.** Take three hands-up answers to '2.5 kg in grams?' and leave 250 g and 25 g on the board alongside 2,500 g. Say out loud you won't settle it until the end — the guessing is the hook, so resist confirming.
2. **Watch and Notice.** Point to the $\times 1000$ chip between the kg and g rungs and let the class read the rule off the ladder rather than saying it yourself. When you reach $75 \text{ g} \rightarrow 0.075 \text{ kg}$, hold out for a pupil to spot the two zeros after the point before you name them.
3. **Try It Together.** Pupils take turns tapping the destination rung; the whole class says ' $\times 1000$ ' or ' $\div 1000$ ' in unison before you tap Check. On $8 \text{ g} \rightarrow \text{kg}$, pause before Check and ask 'which column does the 8 land in?' — three zeros trip pupils up.
4. **Work the Conversions in Your Copy.** Walk the room glancing at the arrow label, not the answer — the direction word ($\times 1000 / \div 1000$) is what tells you a pupil has the rule. No individual marking; this is whole-class copybook practice.
5. **Class Challenge.** Keep the board brisk — pupils type each answer, the interactive marks it, the class confirms, move on. Don't re-explain each one. On $6 \text{ g} \rightarrow 0.006 \text{ kg}$, ask the class to predict the digit's column before Check.

6. What Did We Notice?. Listen for a pupil naming that the quantity is unchanged, only the unit. Revoice it: 'the flour didn't get heavier — we just re-wrote the same mass.' Keep the label question open — both 0.5 kg and 500 g are correct.

COMMON MISCONCEPTIONS

⚠ Pupils convert 2.5 kg to 250 g or 25 g — they move the digits one or two columns instead of the full three that $\times 1000$ needs.

On the ladder, count the three rungs aloud with the class and watch the digits walk one column per rung. Contrast: one rung is $\times 10$, three rungs is $\times 1000$. Have a pupil re-tap and name each rung as it passes.

⚠ For 75 g $\rightarrow$ kg, pupils write 0.75 kg or 0.75 — they drop a zero because they can't place the digits three columns right.

Rebuild 75 g on the ladder and slide the 7 and 5 three columns right, saying the empty columns aloud: 'tenths — empty, hundredths — 7...'. The two placeholder zeros in 0.075 have to be spoken to be believed.

DIFFERENTIATION

EMERGING

- Stay on the friendly whole-times cases (2.5 kg, 3 kg) on the ladder while the class moves to the small-gram decimals; the $\div 1000$ rows are teacher-supported.
- In the copybook, pre-write the arrow so pupils only choose $\times 1000$ or $\div 1000$ rather than drawing the layout themselves.

DEVELOPING

- After the copybook, ask pupils to write both 0.5 kg and 500 g for one mass and check they land on the same ladder rung.
- Give a missing-number variant: ? g = 1.4 kg, then ? kg = 90 g, so they run the rule both directions in one line.

PROFICIENT

- Narrate a two-jump stretch at the board: convert 2,500 mg to kg (or ask 'what if the label read in milligrams?') so pupils reason about $\times 1000$ applied twice — then pull them ahead into the Student Activity Book.

➤ **Cross-curricular:** Tie to home economics — pupils rewrite a real recipe's ingredient list, converting each gram amount into kilograms and back.

ANSWER KEY

Scaffold: visual check on the page

Q1: 3,000 g

Q2: 500 g

Q3: 0.5 kg

Q4: 250 g

Q5: 0.075 kg

a) Always : Multiplying 2.5 by 1000 moves the digits three places left to give 2500 g.

b) Always : One kilogram is exactly one thousand grams so the conversion is always $\times 1000$.

c) Never : 3 kg is 3000 g, ten times more than 300 g.

d) Sometimes : 0.5 kg becomes 500 g (whole) but 0.075 kg becomes 75 g while 1.25 kg becomes 1250 g; some stay whole, some need care with place value.