Conversion Factors

RP09-V1 · storyboard · RP09 Convert with a conversion factor. Read each picture with its sentences.

Picture 1

How many metres are in 64 cm?

$$1\ \text{m} = 100\ \text{cm} \ \Rightarrow\ \frac{1\ \text{m}}{100\ \text{cm}} = 1$$ equal amounts

$$64\ \text{cm} \times \frac{1\ \text{m}}{100\ \text{cm}}$$ cm underneath

$$= \boxed{0.64\ \text{m}}$$

1. How many metres are in 64 centimetres?
2. One metre is 100 centimetres, so 1 metre over 100 centimetres equals 1.
3. Centimetres go underneath, so they cancel.
4. 64 divided by 100 is 0.64 metres.

Picture 2

Trap $64\ \text{cm} \rightarrow \text{m}$

$\times\ 64 \times 100 = 6400\ \text{m}$

$\checkmark\ \ 64 \div 100 = 0.64\ \text{m}$

5. Watch for the trap: the factor upside down.
6. A metre is bigger than a centimetre, so there are fewer metres: 0.64, not 6400.

Picture 3

A soda has 450 calories per litre. How many calories are in 250 mL?

$$250\ \text{mL} \times \frac{1\ \text{L}}{1000\ \text{mL}} = 0.25\ \text{L}$$ mL underneath

$$0.25\ \text{L} \times \frac{450\ \text{calories}}{1\ \text{L}}$$ a rate is a factor too

$$= \boxed{112.5\ \text{calories}}$$

7. A soda has 450 calories per litre.
8. How many calories are in 250 millilitres?
9. First change the millilitres into litres: 250 over 1000 is 0.25 litres.
10. The rate, 450 calories per litre, is a conversion factor too.
11. The litres cancel.
12. 0.25 times 450 is 112.5 calories.

Picture 4

Trap $250\ \text{mL},\ \ 450\ \text{calories per L}$

$$\times\ 250 \times 450 = 112\,500$$

$$\checkmark\ \ 0.25 \times 450 = 112.5$$

13. Watch for the trap: dropping the units.
14. 250 times 450 mixes millilitres and litres.
15. Write the units, and change one of them first.