

What do I need to be able to do?

You should be able to :

- Recognise metric measures
- Convert metric measures
- Calculate with metric measures
- Convert between units of time
- Understand compound measures
- Work out compound units

Metric Units

Length

- Millimetres (mm)
- Centimetres (cm)
- Metres (m)
- Kilometres (km)

The average height of a man is 2m



Mass

- Grams (g)
- Kilograms (kg)
- Tonnes (t)

The average weight of a 6 week old puppy is 3kg



Capacity

- Millilitre (ml)
- Litre (l)

The average capacity of a water bottle is 500ml



Imperial Units

Length

- 1 inch $\approx$ 2.5cm
- 1 foot = 12 inches
- 1 mile $\approx$ 1.6km

" - inches
' - feet

Mass

- 1 ounce $\approx$ 28g
- 1 pound = 16 ounces
- 1 stone = 14 pounds

lb - pounds
oz - ounces
st - stone

Capacity

- 1 pint $\approx$ 568ml
- 1 gallon = 8 pints

In your exam, you will be given the conversion from metric to imperial if needed but it's always useful to be familiar with them!

Time

Remember:

- 60 seconds = 1 minute
- 60 minutes = 1 hour
- 24 hours = 1 day
- 7 days = 1 week



DON'T FORGET, 15 minutes is often referred to as a quarter of an hour (as 15 is a quarter of 60) and 30 minutes is referred to as half an hour.

Example 1

Convert 3.4 days to hours

Step 1

- 1 day = 24 hours, so
- 3 days = 72 hours

Step 2

- 0.4 of a day, think of this as $\frac{2}{5}$ of a day
- $\frac{2}{5}$ of a day = 24 hours
- $\frac{2}{5}$ of a day = 9.6 hours

So 3.4 days = 81.6 hours

Example 2

Reece finishes a sudoku puzzle in 354 seconds Daniel takes 5 minutes and 20 seconds. Who finished the quickest, and by how long?

REECE - 354 seconds

60 seconds = 1 minute
300 seconds = 5 minutes

REECE - 5 mins 54 seconds

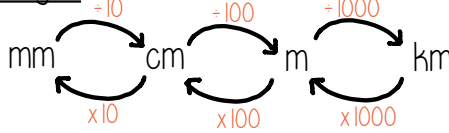
DANIEL finished 34 seconds quicker

UNIT CONVERSIONS

Key Words

- Length: the distance from one point to another
- Mass: a measure of how much matter is in an object
- Capacity: the amount an object can contain (usually liquids)
- Volume: the amount of 3-dimensional space an object takes up
- Convert: change a value or expression from one value to another
- Unit: any measurement that there is one of
- Imperial: a system of weights and measures originally developed in England
- Metric: a system of measuring that replaced the imperial system to fall in line with the rest of Europe
- Compound Units: units which require two types of measurement

Length



10mm = 1cm
100cm = 1m
1000m = 1km } REMEMBER!

Example 1

Convert 123m to mm

$$123\text{m} \times 100 = 12300\text{mm}$$

$$123\text{m} \times 10 = 1230\text{m}$$

It is always helpful to break it up into stages. You could, of course, do this in one step!

Example 2

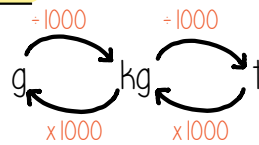
Convert 28400mm to km

$$28400\text{mm} \div 10 = 2840\text{cm}$$

$$2840\text{cm} \div 100 = 28.4\text{m}$$

$$28.4\text{m} \div 1000 = 0.0284\text{km}$$

Mass



1000g = 1kg
1000kg = 1t } REMEMBER!

Example 1

Convert 1458t to g

$$1458\text{t} \times 1000 = 1458000\text{kg}$$

$$1458\text{kg} \times 1000 = 1458000\text{g}$$

Example 2

Convert 15600 to kg

$$15600\text{g} \div 1000 = 15.6\text{kg}$$

Example 3

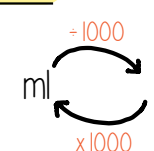
One parcel weighs 280g, how much will 12 weigh? Leave your answer in kgs.

$$280\text{g} \times 12 = 3360\text{g}$$

$$3360\text{g} = 3.36\text{kg}$$

ALWAYS make sure you check back to ensure you've used the right units

Volume



1000ml = 1L } REMEMBER!

Example 1

Convert 5000ml to litres

$$1000\text{ml} = 1\text{litre}$$

$$5000\text{ml} = 5\text{litres}$$

5 litres

Example 2

Convert 1257l to ml

we multiply by 1000, so

$$1257\text{l} = 1257000\text{ml}$$

don't forget to add a 0 place holder!

Example 3

I need 10l of water. I can only buy 300ml bottles. How many bottles do I need to buy?

$$10\text{l} = 10,000\text{ml}$$

$$10,000 \div 300 = 33.333\ldots$$

So we need 33.333 bottles, but we can't buy 0.33 of a bottle! So we need to buy 34!

Compound Measures

Speed, Distance, Time

A car travels 200m in 30 minutes, calculate its speed in mph

$$\begin{aligned} &200\text{m in } 30\text{ mins} \times 2 = 400\text{m in } 60\text{ mins} \\ &400\text{m in } 60\text{ mins} \times 2 = 800\text{m in } 120\text{ mins} \end{aligned}$$



400mph

It takes Ryan 12 minutes to travel 15km, what is his average speed in km/h?

$$\text{SPEED} = \frac{\text{DISTANCE}}{\text{TIME}}$$

$$\text{SPEED} = \frac{15}{0.2}$$

$$\text{SPEED} = 75\text{km/h}$$

notice this says km/h. Our time is in minutes right now! 12 minutes is 0.2 of an hour, so instead of 12 mins, we write time as 0.2 hours

Density, Mass, Volume

Density is a way of looking at the amount of mass contained in a certain volume

The standard units are kg/m^3 or g/cm^3

The density of air is 1.3kg/m^3 . Calculate the mass of a balloon which holds 0.0035m^3 of air.

$$\text{MASS} = \text{DENSITY} \times \text{VOLUME}$$

$$\text{MASS} = 1.3 \times 0.0035$$

$$\text{MASS} = 0.00455\text{kg}$$

we know the units must be kg as the density is given in kg/m^3

Pressure, Force, Area

Pressure indicates the amount of force being exerted per unit area

A box is placed on a table and exerts a force of 200N on an area of 40cm^2 . Find the pressure.

$$\text{PRESSURE} = \frac{\text{FORCE}}{\text{AREA}}$$

$$\text{PRESSURE} = \frac{200}{40}$$

$$\text{PRESSURE} = 5\text{N/cm}^2$$

(N = newtons)

