

Lesson Plan

Converting between units

The table shows some of the most common units and their equivalents. Make sure you know these conversions.

Converting measurements			
Length	$1\text{ km} = 1,000\text{ m}$	$1\text{ m} = 100\text{ cm}$	$1\text{ cm} = 10\text{ mm}$
Weight	$1\text{ tonne} = 1,000\text{ kg}$	$1\text{ kg} = 1,000\text{ g}$	$1\text{ g} = 1,000\text{ mg}$
Capacity	$1\text{ l} = 100\text{ cl}$	$1\text{ cl} = 10\text{ ml}$	$1\text{ l} = 1,000\text{ ml}$

Converting larger units to smaller units

To convert a larger unit to a smaller unit (eg m to cm), first check the number of smaller units needed to make **1** larger unit. Then, multiply that number by the number of larger units.

Converting smaller units to larger units

To convert a smaller unit to a larger unit (eg cm to m), divide it by the number of smaller units which are needed to make **1** larger unit.

To convert from a larger unit to a smaller one, multiply. To convert from a smaller unit to a larger one, divide.

Example

$$1\text{ m} = 100\text{ cm}$$

So, to convert from m to cm multiply by **100**, and to convert from cm to m divide by **100**.

For example:

$$3.2\text{ m} = 320\text{ cm} \quad (3.2 \times 100 = 320)$$

$$400\text{ cm} = 4\text{ m} \quad (400 \div 100 = 4)$$

Question

Convert the following to the units given in brackets:

a) $5,120\text{ g}$ (kg)

b) 15 cl (ml)

c) **245 mm** (m)

Converting units for area and volume

The method for converting between units works the same as the one for converting units of area and volume.

When you are converting one sort of unit to another, you need to know how many smaller units are needed to make **1** larger unit.

For example: $1 \text{ km}^2 = 1 \text{ km} \times 1 \text{ km}$

$1,000 \text{ m} \times 1,000 \text{ m}$

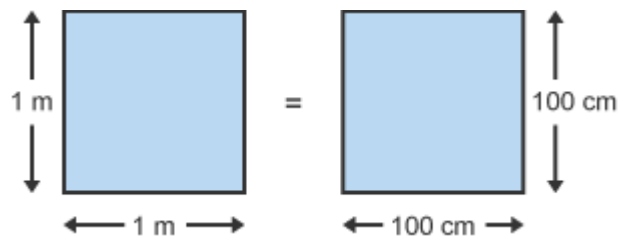
$1,000,000 \text{ m}^2$

- When converting from a larger unit to a smaller unit (eg m^2 to cm^2), you **multiply**.
- When converting from a smaller unit to a larger unit (eg mm^2 to cm^2), you **divide**.

Example 1

Convert **50,000 cm²** into **m²**.

$1 \text{ m} = 100 \text{ cm}$.



So, $1 \text{ m}^2 = 100 \text{ cm} \times 100 \text{ cm} = 10,000 \text{ cm}^2$.

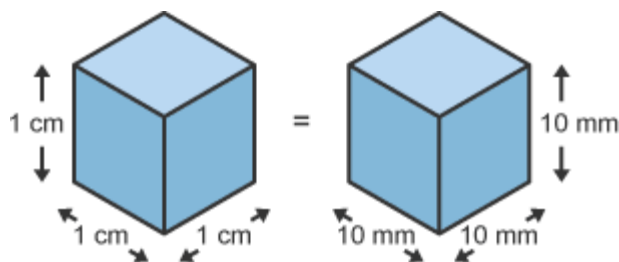
You are converting from a smaller unit (cm^2) to a larger unit (m^2), so divide.

$50,000 \text{ cm}^2 = 50,000 \div 10,000 = 5 \text{ m}^2$.

Example 2

Convert **10 cm³** into **mm³**.

$1 \text{ cm} = 10 \text{ mm}$.



So, $1 \text{ cm}^3 = 10 \text{ mm} \times 10 \text{ mm} \times 10 \text{ mm} = 1,000 \text{ mm}^3$.

You are converting from a larger unit (cm^3) to a smaller unit (mm^3), so multiply.

$$10 \text{ cm}^3 = 10 \times 1,000 = 10,000 \text{ mm}^3$$

Accuracy

To check the accuracy of a rounded number, you need to find the largest and smallest numbers that it could have been rounded from.

Question

Q1. The number of children in a school is **800**, correct to the nearest **100**. What is the largest possible and smallest possible number of children in the school?

Q2. Amelia spends **£80** in the local supermarket, correct to the nearest **£10**. What is the greatest and least amount that Amelia could have spent?

Speed, distance and time

Speed is worked out by dividing the distance travelled by the time taken:

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

The formula can also be written in this form:

$$\text{Speed} = \text{Distance} \div \text{Time}$$

Question

If you travel **70 km** in **2** hours, what is your average speed?

Reveal answer

$$\text{Speed} = \text{distance} \div \text{time}$$

$$\text{Speed} = 70 \div 2 = 35 \text{ km/h}$$

The distance in km and the time in h - so the units for speed are km/h.

Another suitable metric unit for speed is metres per second. Using metres per second would be suitable when measuring short distances and short periods of

time. For example, an athlete might run the **400 m** race in **56** seconds. What is the average speed for the **400 m** race?

$$\text{speed} = \text{distance} \div \text{time}$$

$$= 400 \div 56$$

$$= 7.14 \text{ m/s (2 decimal places)}$$

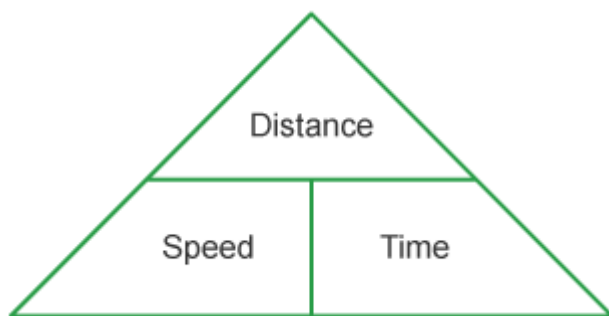
If you know the speed, you can work out the time or the distance by rearranging the equation:

$$\text{speed} = \text{distance} \div \text{time} \text{ or } \text{speed} = \frac{\text{distance}}{\text{time}}$$

$$\text{distance} = \text{speed} \times \text{time}$$

$$\text{time} = \text{distance} \div \text{speed} \text{ or } \text{time} = \frac{\text{distance}}{\text{speed}}$$

The triangle below is a good way to remember the equations:



To use the triangle, cover the value required and the formula that you need will be revealed by the location of the two values that you can see.

For example:

- For **time**, you see distance above speed, so $\text{time} = \frac{\text{distance}}{\text{speed}}$
- For **distance**, you see speed alongside time, so $\text{distance} = \text{speed} \times \text{time}$

Question

If you walk for $1\frac{1}{2}$ hours at an average speed of **4 miles/h**, how far will you have walked?