

Conversion of units



**Year 11 General Maths
Units 1 and 2**

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Learning Objectives

By the end of the lesson I would hope that you have an understanding and be able to apply to questions the following concepts:

- Understand the three main units used for length, mass and time
- Know how to convert between units of length, area and volume

Recap

In the previous lessons we have looked at:

- Order of operation (BIDMAS), and
- Directed Numbers
- Powers and roots
- Approximations, decimal places and significant figures

This part of the course is recapping all the foundations you are going to be using for the rest of the course. It's really important that you practice the skills being taught and apply them as much as you can.

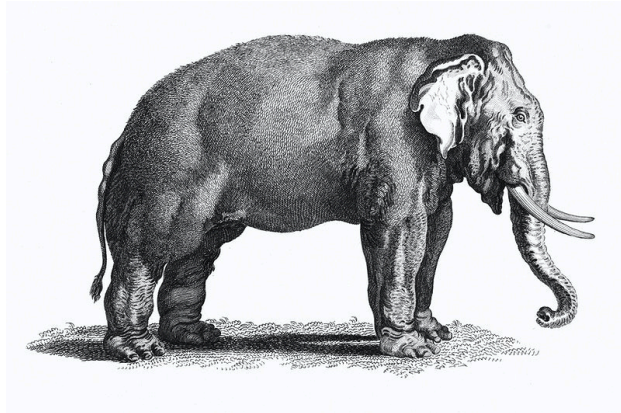
Best units to measure something in?

It's not always sensible to measure everything in cm, grams or seconds.

I wouldn't measure the height of a building in cm.

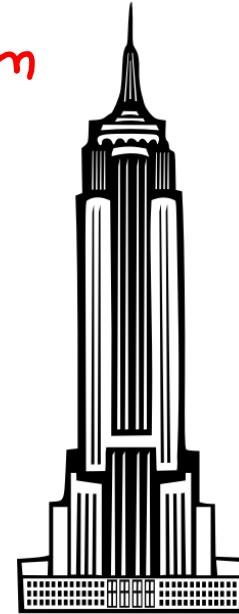
I wouldn't measure the weight of an elephant in grams.

I wouldn't measure the time it takes for me to fly from Melbourne to London in seconds.



t

m



hours



Main units of Measurement

There is an agreed convention of units of measurement:

*The International System of Units (SI, abbreviated from the French *Système international (d'unités)* is the modern form of the metric system*

We are going to use three of these in this section of the course:

m
Kg
s

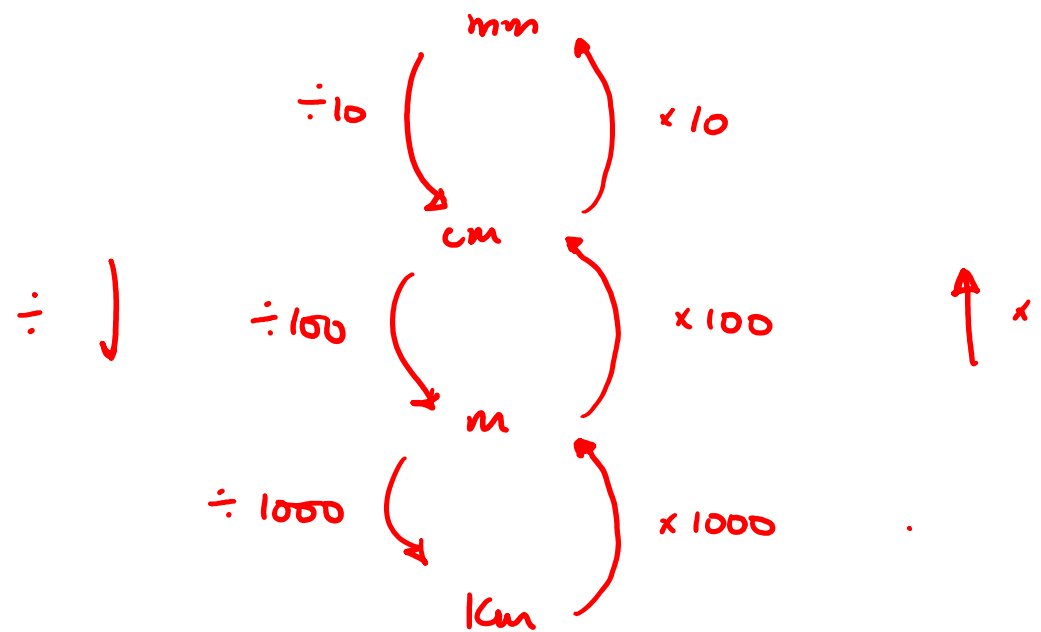
Unit name	Unit symbol	Dimension symbol	Quantity name
second [n 1]	s	T	time
metre	m	L	length
kilogram [n 2]	kg	M	mass
ampere	A	I	electric current
kelvin	K	Θ	thermodynamic temperature
mole	mol	N	amount of substance
candela	cd	J	luminous intensity

Converting units of length

The units of length we are used to measuring items are:

mm
cm
m
Km

We need to know how to convert between each of these units.

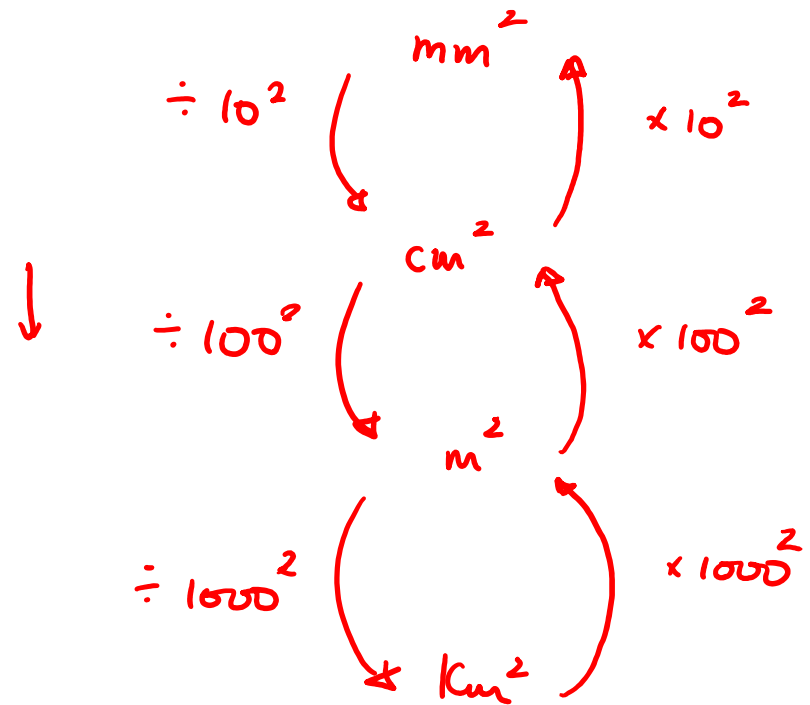
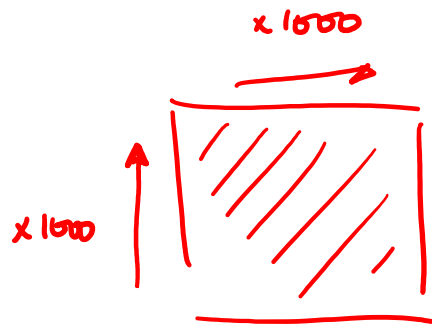


Converting units of Area

The units of length we are used to measuring items are:

mm^2
 cm^2
 m^2
 km^2

We need to know how to convert between each of these units.

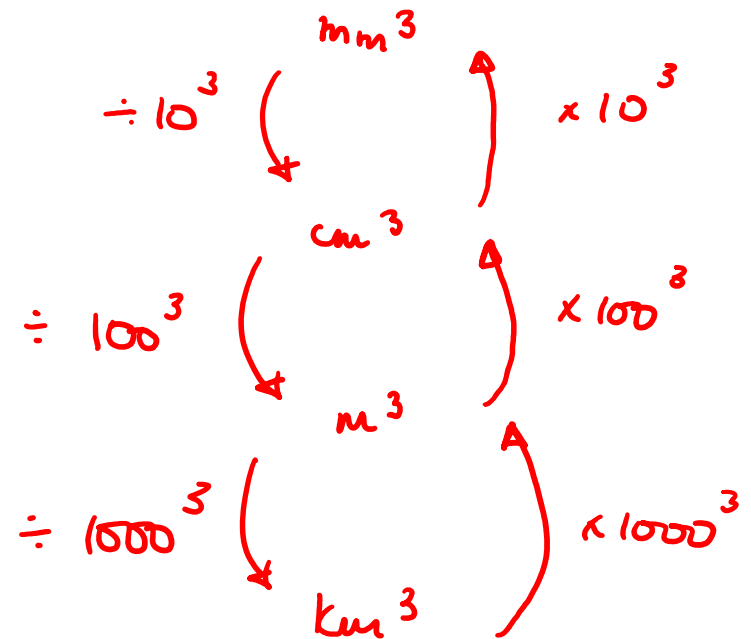
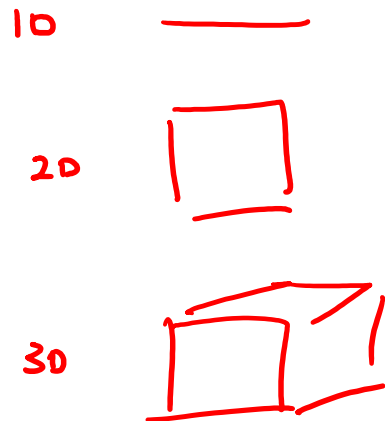


Converting units of Volume

The units of length we are used to measuring items are:

mm^3
 cm^3
 m^3
 km^3

We need to know how to convert between each of these units.



Other important conversions

There are other important conversions we need to know

- \Rightarrow 1 kilolitre = 1000 litres
- \Rightarrow 1 litre = 1000 millilitres

- \Rightarrow 1 tonne = 1000 kilograms
- 1 kilogram = 1000 grams
- 1 gram = 1000 milligrams

$$2000 \text{ litres} = 2 \text{ kilolitres}$$

$\div 1000$

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

$\div 1000$

Examples of converting between units

Convert these measurements into the units given in the brackets:

- a. 5.2 km (m)
- b. 339 cm² (m²)
- c. 9.75 cm³ (mm³)

Handwritten solutions for the conversion problems:

a. $5.2 \text{ km} \rightarrow 5200 \text{ m}$
 $\times 1000$

b. 339 cm^2
 $\div 100$
 3.39
 $\div 100$
 0.0339 m^2

c. 9.75 cm^3
 $9.75 \times 10 \times 10 \times 10$
 9750
 $9.75 \text{ cm}^3 = 9750 \text{ mm}^3$

Diagram for (c): An arrow points from 'cm' to 'mm' with $\times 10^3$ written next to it.

Examples have been extracted, with permission, from
the Cambridge General Mathematics Units 1 and 2 Textbook

Examples of converting between units requiring more than one step

Convert these measurements into the units given in the brackets:

- a. 40 000 cm (km)
- b. 0.000 22 km² (cm²)
- c. 0.08 m³ (mm³)

$$40\ 000\ \text{cm} \rightarrow 40\ \text{km}$$

$$40\ 000 \div 10 \div 100$$

←
3

$$\begin{array}{l} \text{mm}^3 \\ \text{cm}^3 \\ \text{m}^3 \end{array} \begin{array}{l} \uparrow \\ \uparrow \\ \uparrow \end{array} \begin{array}{l} \times 10^3 \\ \times 10^3 \\ \times 10^3 \end{array}$$

$$0.000\ 22 \times 100 \times 100 \times 10 \times 10$$

→
6

$$\underline{220\ \text{cm}^2}$$

$$0.08 \times 100 \times 100 \times 100 \times 10 \times 10 \times 10$$

→
7

$$\underline{8\ 000\ 000\ \text{mm}^3}$$

8 000 000 000

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Thanks for watching

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