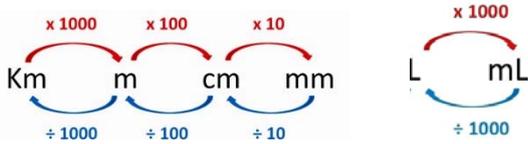# Maths Knowledge Organiser
Year 8 Ratio and Proportion

Converting units

Select the correct conversion factor then either multiply or divide.

We can use ratio to help with conversions
Given that **1km = 1000m** calculate how many meters in 4.2km

$$\begin{array}{ccc} 1\text{km} & : & 1000\text{m} \\ \downarrow\text{x4.2} & & \downarrow\text{x4.2} \\ 4.2\text{km} & : & 4200\text{m} \end{array}$$

Ratio – Sharing

We can share an amount into a ratio
Ratio of blue to green token is 2:3

Scenario 1 – given total
There are 45 token in total → 45 ÷ 5 = 9

Blue	9	9		18 blues
Green	9	9	9	27 greens

Scenario 2 – given one amount
There are 30 blue tokens → 30 ÷ 2 = 15

Blue	15	15		30 blues
Green	15	15	15	45 greens

Scenario 3 – given difference
There are 12 more green than blue tokens → 12 ÷ 1 = 12

Blue	12	12		24 blues
Green	12	12	12	36 greens

Direct proportions

The relation between quantities whose ratio is constant.
"sensors emit an electronic signal **in direct proportion to** the amount of light detected"
Mathematically we can multiply and divide by the same number to work out different things:
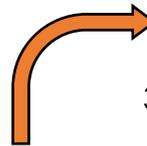
4 pens cost £3.20
Multiply by 2
8 pens cost £6.40
Divide by 8
1 pens cost £0.80
Multiply by 30
30 pens cost £24.00

Working out the value of 1 is called the unitary method and is the most useful.

Proportions

A part, share, or number considered in comparative relation to a whole.

In the bag the proportion of counters which are green:

$$\frac{2 \;\leftarrow\; \text{Amount that are green}}{5 \;\leftarrow\; \text{Total}}$$

Ratio – Simplifying

Ensure all parts of ratio are the same unit, and divide by a common factors

3kg:2000g → 3000g : 2000g
÷1000   ÷1000
3 : 2g

Ratio – unit ratio

Is where we simplify the ratio until it has a 1 in it, this may include decimals.
For examples → 4 loaves take 320 minutes
4:320
2:160
1:80 → this is the unit ratio