



YEAR 8
KNOWLEDGE ORGANISERS



BLOCK: PROPORTIONAL REASONING
Ratio and Scale

"MATHS OPENS DOORS"

YEAR 8 - PROPORTIONAL REASONING...

Ratio and Scale

What do I need to be able to do?

By the end of this unit you should be able to:

- Simplify any given ratio
- Share an amount in a given ratio
- Solve ratio problems given a part

Solutions should be modelled, explained and solved

Keywords

Equal parts: a whole shared equally into a number of parts

Equivalent: having the same value

Factor: a whole number or variable that divides exactly into another number or expression

Order: to place numbers in a determined sequence

Part: a section of a whole

Proportion: a part, share or number considered by comparing it to a whole

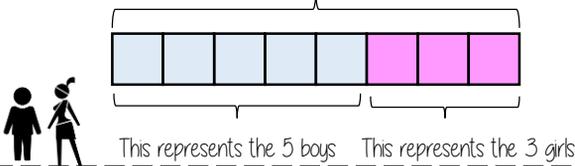
Ratio: a ratio shows the relative sizes of two or more values

Scale: the markings on an axis to show what numbers are represented on it

Representing a ratio

"For every 5 boys there are 3 girls"

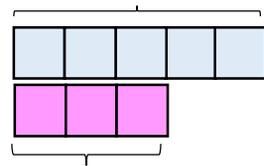
This is the "whole" - boys and girls together



5:3

This represents the 5 boys

Double Number Line



This is the "whole" - boys and girls together

This represents the 3 girls

Order is Important

"For every dog there are 2 cats"



The ratio has to be written in the same order as the information is given

e.g. 2:1 would represent 2 dogs for every 1 cat ✗

Simplifying a ratio

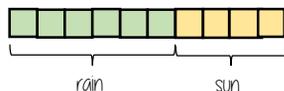
Cancel down the ratio to its lowest form

"For every 6 days of rain there are 4 days of sun"

6:4

+ by 2 ↓

3:2



Find the biggest common factor that goes into all parts of the ratio

For 6 and 4 the biggest factor (number that multiplies into them is 2)

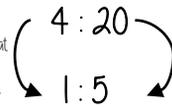
"For every 3 days of rain there are 2 days of sun" - when this happens twice the ratio becomes 6:4.

Ratio In (or n:1)

This is asking you to cancel down until the part indicated represents 1

Show the ratio 4:20 in the ratio of 1:n

The question states that this part has to be 1 unit. Therefore Divide by 4



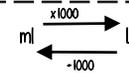
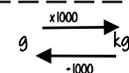
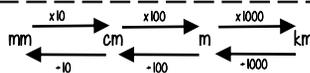
This side has to be divided by 4 too - to keep in proportion

**the n part does not have to be an integer for this type of question

Units are important:

When using a ratio - all parts should be in the same units

Useful Conversions



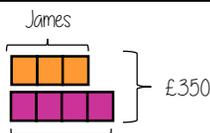
Sharing a whole into a given ratio

James and Lucy share £350 in the ratio 3:4. Work out how much each person earns

Model the Question

James: Lucy

3:4



Lucy

£350 ÷ 7 = £50

□ = one part = £50

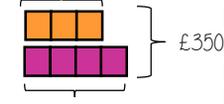
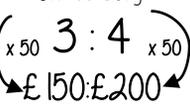
Find the value of one part

Whole: £350
7 parts to share between (3 James, 4 Lucy)

Put back into the question

James: Lucy

James = 3 x £50 = £150



Lucy = 4 x £50 = £200

Finding a value given 1:n (or n:1)

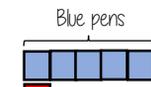
Inside a box are blue and red pens in the ratio 5:1. If there are 10 red pens how many blue pens are there?

Model the Question

Blue: Red

5:1

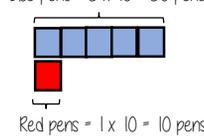
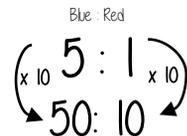
□ = one part = 10 pens



One unit = 10 pens

Put back into the question

Blue pens = 5 x 10 = 50 pens



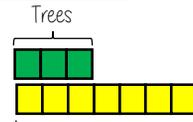
There are 50 Blue Pens

Ratio as a fraction



Trees: Flowers

3:7



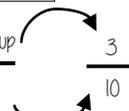
Ratio

There are 3 parts for trees

Fraction of trees

Number of parts in group

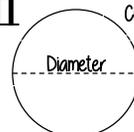
Total number of parts



Fraction

Trees parts 3 + Flower parts 7 = 10

π



Circumference

The ratio of a circles circumference to its diameter