Year 7 Knowledge Organiser –
Ratio and Proportion

Objectives

Use ratio notation, including reduction to simplest form

Divide a given quantity into two parts in a given part:part or part:whole ratio

Key Vocabulary

Ratio – a statement of how two or more numbers compare

Equal Parts - all parts in the same proportion, or a whole shared equally

Proportion - a statement that links two ratios

Order - to place a number in a determined sequence
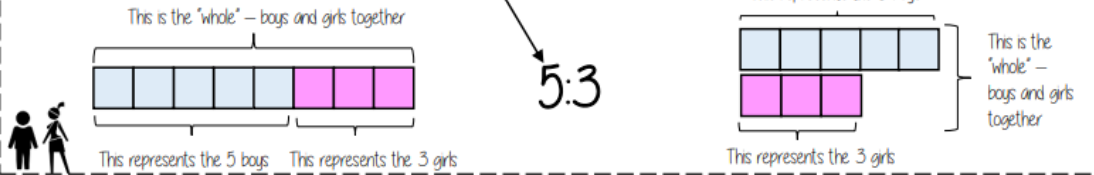
Part - a section of a whole

Equivalent - of equal value

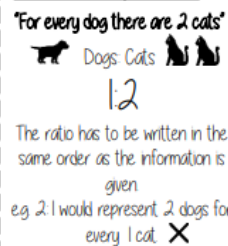**Factors** - integers that multiply together to get the original value

Simplest Form – where the HCF has been used to reduce the ratio. Each part of the ratio now does not have a common factor larger than 1.
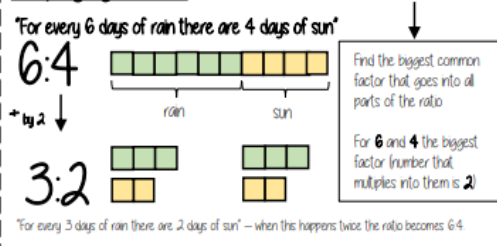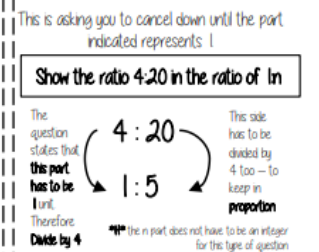
Representing a ratio

"For every 5 boys there are 3 girls"

This is the "whole" – boys and girls together

This represents the 5 boys
This represents the 3 girls

$5:3$

Double Number Line

This represents the 5 boys

This is the "whole" – boys and girls together

This represents the 3 girls

Order is Important

"For every dog there are 2 cats"

Dogs:Cats

$1:2$

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

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

$6:4$

÷ by 2

$3:2$

rain   sun

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

For 6 and 4 the biggest factor (number that multiples 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

Cancel down the ratio to its lowest form

Ratio 1:n (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

$4:20$
$1:5$

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

n in the n:n 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

mm ×10 cm ×100 m ×1000 km
÷10 ÷100 ÷1000

g ×1000 kg
÷1000

ml ×1000 L
÷1000
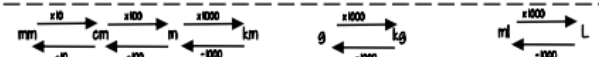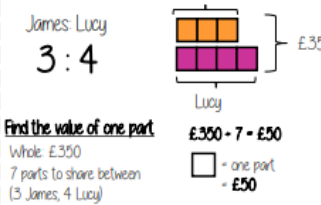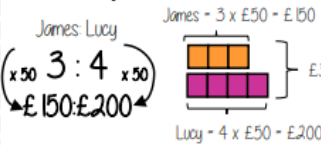
Sharing a whole into a given ratio

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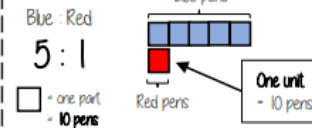
Model the Question

James:Lucy

$3:4$ £350

James
Lucy

Find the value of one part

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

£350 ÷ 7 = £50

= one part = £50

Put back into the question

James:Lucy

(×50) $3:4$ (×50)
£150:£200
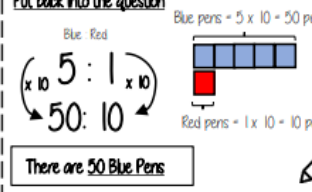
James = 3 × £50 = £150
Lucy = 4 × £50 = £200

£350

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

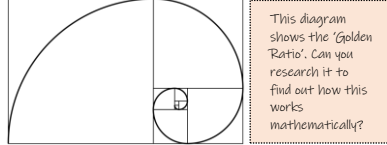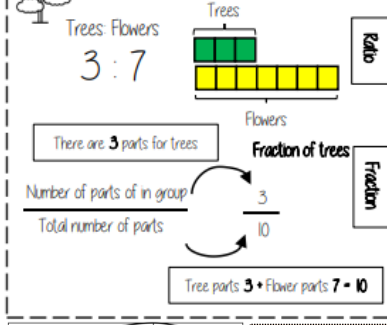Inside a box are blue and red pens in the ratio 5:1. If there are 10 red pens how many blue pens are there?

Model the Question

Blue:Red

$5:1$

☐ = one part = 10 pens

Blue pens
Red pens

One unit = 10 pens

Put back into the question

Blue:Red

(×10) $5:1$ (×10)
$50:10$

Blue pens = 5 × 10 = 50 pens
Red pens = 1 × 10 = 10 pens

There are 50 Blue Pens

Ratio as a fraction

Trees:Flowers

$3:7$

Trees

Flowers

There are 3 parts for trees

$\frac{\text{Number of parts of in group}}{\text{Total number of parts}} = \frac{3}{10}$

Tree parts 3 + Flower parts 7 = 10

Ratio

Fraction of trees

Fraction

This diagram shows the 'Golden Ratio'. Can you research it to find out how this works mathematically?

Real-life ratio example…

Question 1: Jake is making scones.
Here is a list of ingredients to make 8 scones.

8 Scones
200g flour
30g caster sugar
50g butter
140ml milk
1 egg

How much of each ingredient would be needed to make:

(a) 16 scones?   (b) 4 scones?   (c) 24 scones?

(d) 40 scones?   (e) 80 scones?   (f) 2 scones?

Decide how the quantity of scones has changed from the recipe into how many Jake needs to make each time.

What do you need to multiply or divide each quantity by?

Question 2: Chloe is making ice cream.
She is using the recipe below.

serves 4
300ml double cream
320ml milk
120g caster sugar
1 vanilla pod
4 egg yolks

How much of each ingredient would Chloe need to make enough for:

(a) 8 people?   (b) 2 people?   (c) 1 person?

(d) 3 people?   (e) 6 people?   (f) 10 people?

Where the new quantity isn't a multiple or factor of the original quantity, express the change as a fraction…
e.g. For part (d) Chloe needs to alter the recipe to feed 3 people 'out of' 4 people. Therefore we can multiply each ingredient by ¾ to find the new amount.

Give of Your Best