Year 8- Proportional Reasoning – Ratio and Scale

Essential knowledge

Ratio Notation, Simplification of Ratio and Importance of Order.
Share an amount in a given ratio.
Multiplicative Relationship between two quantities can be expressed as a ratio and a fraction.

Key Vocabulary

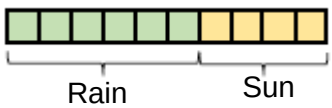
Ratio: a statement of how two numbers compare
Equal Parts: all parts in the same proportion, or a whole shared equally
Proportion: a statement that links two ratios
Order: to place a number in a determined sequence
Part: a section of a whole
Equivalent: of equal value
Factors: integers that multiply together to get the original value
Scale: the comparison of something drawn to its actual size.

Prior learning links

Understand the language of ratio (Y6)
Understand the use of the ratio symbol (Y6)
Representing ratio using bar model (Y6)

Simplifying Ratio

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

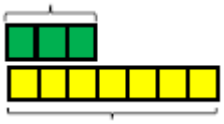


6:4
÷ by 2
3:2

"For every 3 days of rain, there are 2 days of sun"

. Find the highest common factor of both parts
. Divide both parts by the factor to show both parts in their simplest form

Ratio as a Fraction



Trees : Flowers

3 : 7

Fraction Conversion:

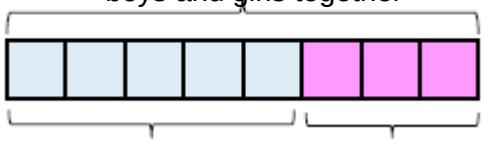
$$\frac{\text{Number of parts in one group}}{\text{Total Number of parts}}$$

Trees as a Fraction = $\frac{3}{10}$

Ratio Notation

5 : 3
"For every 5 boys there are 3 girls"

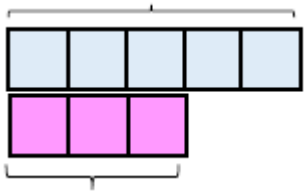
This represents the whole – boys and girls together



This represents 5 boys

This represents 3 girls

This represents 5 boys



This represents 3 girls

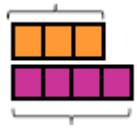
Note how important the order of boys and girls is written

This represents the whole – boys and girls together

Sharing Amounts in a Given Ratio

James and Lucy share £350 in the ratio 3:4.

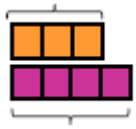
Represent the question in a bar model



Find the value of one part.
Total (£350)
Number of parts = 7
One part = 350 ÷ 7 = £50

James = £50 x 3 = £150

Put value back into ratio.
James : Lucy
3 : 4
x50
£150 : £200



Lucy = £50 x 4 = £200

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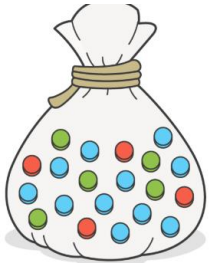
Prior learning links

Express the following statements as a ratio:

“For every 6 dogs, there are 8 cats”

“For every teacher, there are 5 pupils”

Express the following diagram as a ratio of red counters to green to blue:



Key Vocabulary

Define the following key words:

Ratio -

Proportion-

Factors -

Simplifying Ratio

Write the following ratios in their simplest form:

5:15

8:20

24:36

48:64

6: 18 : 33

Ratio in the form 1:n

Write the following ratios in the form 1:n

5 : 20

2 : 7

10 : 18

0.5 : 0.2

Ratio as a Fraction

The ratio of bees to spiders in a garden is 2:7.
What fraction of the insects are spiders?

In a youth club, for each child with black hair, there are 3 people with blonde hair and 4 people with brown hair.
What fraction of the children at the youth club do not have blonde hair?
Give your answer in its simplest form.

Sharing Amounts in a Given Ratio

Andrew and Mary share 60 sweets in the ratio 2:3.
How many sweets does each person receive?

In a garage, the amount of red cars to the amount of blue cars is in the ratio 5:3.
There are 96 cars in the garage. How many of them are blue?

John, Kevin and Leah share £42 in the ratio 5 : 1 : 4.
How much money does each person receive?