YR6 Knowledge Organiser - Ratio

Key Concepts

- Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts
- Solve problems involving similar shapes where the scale factor is known or can be found
- Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples

Key Vocabulary

- ratio / proportion
- quantity / value
- 'for every'
- part / whole
- symbol / colon
- scale factor / enlargement
- fraction / numerator / denominator

Ratio Language

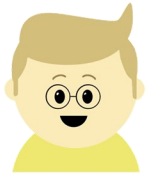
A ratio shows the relationship between two values. It helps us to describe how one value is related to another.

"For every apple, there are two oranges. For every two oranges, there is one apple."

The Ratio Symbol

Once we can describe the relationship between two values, we can use the ratio symbol to express a ratio. The ratio symbol is a colon.

"The ratio of apples to oranges is 2 to 4. We can simplify this to 1 to 2 and write the ratio as 1:2"



Fractions can help us to understand ratios further.

2 out of every 3 are oranges therefore $\frac{2}{3}$ of the fruit are oranges.

The denominator shows the total number of fruit and the numerator shows us the number of oranges.

When using the ratio symbol, it is important to put the numbers in the correct order.

The ratio of blue to yellow counters is 4 : 3

The ratio of yellow to blue counters is 3 : 4

Calculate Ratio

We can build on our understanding of ratio by calculating ratios for different purposes.

A gardener plants some flowers. For every 2 pansies, she plants 5 tulips. She plants 28 flowers in total.

To work out the number of each flower that is planted, we first need to find the total number of 'parts' in the ratio.

2 + 5 = 7 so there are 7 'parts'

$\frac{2}{7}$ are pansies and $\frac{5}{7}$ are tulips.

Next, we divide the total by the number of parts.

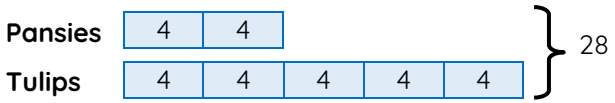
28 ÷ 7 = 4 so each 'part' is worth 4

Now, we multiply the value of each part by each number in the ratio.

There are 8 pansies because 4 × 2 = 8.

There are 20 tulips because 4 × 5 = 20.

Bar models can help us to visualise the calculation.



YR6 Knowledge Organiser - Ratio

A baker mixes 3 parts of flour with 2 parts of sugar in a cake recipe. He uses 18 parts of flour in total.

To work out the parts of sugar used, we first divide the number of parts used for the flour by the number representing flour in the ratio:

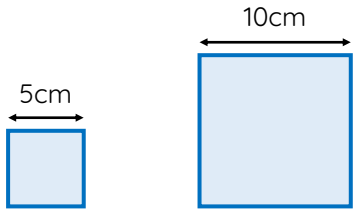
18 ÷ 3 = 6 so the number of parts is 6 × greater

We can then multiply the number representing sugar in the ratio by the same amount:

6 × 2 = 12 so 12 parts of sugar is used

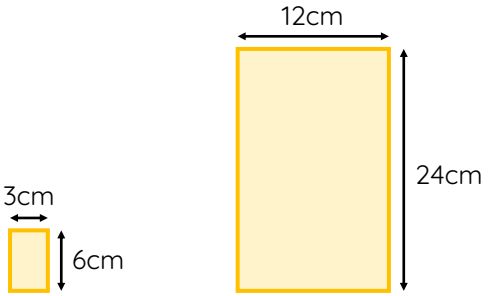
Scale Factors

We can enlarge shapes using scale factors. If we enlarge a shape by scale factor 2, for example, we would make it twice as big as shown below.

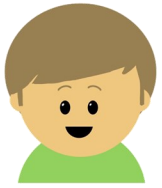


If we enlarge a shape by scale factor 3, we would make it 3 times as big, and so on...

We can use this knowledge to calculate the scale factor of similar shapes.



12 ÷ 3 = 4 and 24 ÷ 6 = 4 so the shape has been enlarged by scale factor 4



"It is important to know that the word 'similar' in this context means that the bigger shape is an exact enlargement of the smaller one."

Ratio and Proportion Problems

We can apply our new knowledge to solve ratio and proportion problems.

Cupcake recipe (for 12 cakes)

100g self-raising flour, 120g butter, 140g caster sugar, 2 eggs, 1 tsp vanilla extract

We can use this information to work out the recipe for 6 people.

12 ÷ 2 = 6 so we need to divide each of the measurements by 2

We need 50g self-raising flour, 60g butter, 70g caster sugar, 1 egg and ½ tsp vanilla extract.

When shopping, we can work out which items set at different prices are the best value for money.

Pack of 4 bread rolls

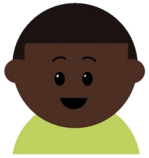
£1.96

Pack of 6 bread rolls

£2.82

1.96 ÷ 4 = 49p so each of the bread rolls in the 4 pack costs 49p.

2.82 ÷ 6 = 47p so each of the bread rolls in the 6 pack costs 47p.



"The pack of 6 bread rolls are more expensive but they are better value than the pack of 4 bread rolls."

Again, we can use bar models to calculate the value of each part in a ratio problem as they provide valuable pictorial support.