



Year 6 Summer 1 Week 3 – Calculating Fractions, Ratio and Proportions

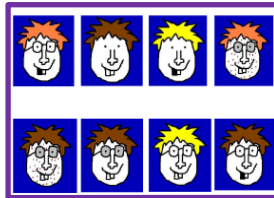
Main Learning

- Multiply simple pairs of proper fractions, writing the answer in its simplest form (*using diagram*) (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$).
- Divide proper fractions by whole numbers (*using diagram*) (e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$).
- 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 the calculation of percentages (for example, of measures, and such as 15% of 360) and the use of percentages for comparison.
- 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.

Success Criteria

Practice and Consolidation

How many ratio and proportion statements or questions can be asked related to this image?



What proportion of the numbers in the chart are odd?
 (Are between 33 and 66, inclusive?)
 (Are at least one 3 or a digit?)
 (Are prime numbers?)
 (What is the ratio of odd numbers to even numbers?)
 (What is the ratio of odd numbers to multiples of 2?)
 (What is the ratio of odd numbers to only odd digits?)
 (What questions could you ask that have an answer of 50%?)

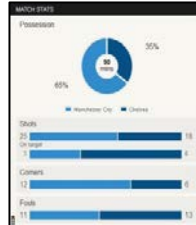
Proportions on a 100 Square

Two Squares
 You need eight cards 1-7. Place white spots on the other so that the sum of the numbers in the large square is three times the sum of the numbers in the small square.
 Investigate all the ways of doing it.

Two Squares

100 Percent
 Make 100%. Can you work out how many of the squares would be shaded for 100 percentage that the computer asks for? It will keep asking until you get 100%!
 Correct! You got 14 squares.

100 Percent - Nrich



Sports statistics can be used for work on ratio and proportion. The BBC Sport website gives information for each football game in the match reports.

ICT

Percentage Chains
 From 100% to 1% and back to 100% using percentage chains to solve the problem.

Proportion
 A number that is 1/4 of 100 is 25. If you have 100 apples and you eat 25, how many do you have left? Use the number line to help you.

Fractions, Decimals and Percentages
 Fractions grid
 Make your own grid
 Ratio
 Proportion Grids

Vocabulary

fraction, proper fraction, improper fraction, mixed number, numerator, denominator, equivalent, simplify, reduced to, cancel, one whole, half, quarter, eighth, hundredth, thousandth, proportion, ratio, decimal, vulgar fraction, decimal fraction, decimal point, percentage, percent, %, scale factor, similar.

Modelling

Consolidate children's understanding of calculating with fractions by modelling it using diagrams. Use this slide show to model $\frac{1}{4} \times \frac{1}{2}$ and interpreting it as finding $\frac{1}{4}$ of $\frac{1}{2}$.

Multiplying Fractions
 Multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$)

If $\frac{1}{4} \times \frac{1}{2}$ can be interpreted as:
 4 multiplied by 2
 4 times 2
 4 lots of 2
 4 groups of 2

$\frac{1}{4} \times \frac{1}{2}$ can be interpreted as:
 A quarter of a half (or vice versa)
 $\frac{1}{4}$ of $\frac{1}{2}$

Once children recognise the relationships between the numerators and denominators of the fractions being multiplied and the answer, they should use the rule:

multiply the numerators together and multiply the denominators together
 Use this slide show to model the $\frac{1}{3}$ divided by 2 and interpreting it as finding $\frac{1}{2}$ of $\frac{1}{3}$.

Dividing Fractions
 Divide proper fractions by whole numbers (e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$).

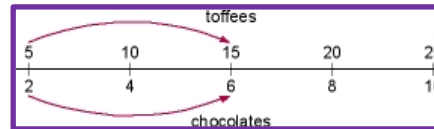
This PowerPoint Show reminds children about the definitions of ratio and proportion and the vocabulary and terminology surrounding them.

Ratio is...
 The comparison of part to part.

For every...
 To every...
 As many as...
 Scale...

3 parts red to every 5 parts green.
 The ratio of red to green is 3:5
 The ratio of green to red is 5:3

Click on the image below for further guidance on teaching direct proportion.



This PowerPoint Show teaches children that images can support understanding when scaling a problem up.

Ratio and Proportion Modelling
 Supna makes a fruit salad using bananas, oranges and apples. For every one banana, she uses two oranges and three apples. Supna uses 14 fruits. How many oranges does she use?

Fruits	Oranges
6	2
12	4
18	6
24	8



Using and Applying

Tina has 440 sweets of which 40 are red. Ryan has 540 sweets of which 45 are red. Who has the greater proportion of red sweets? Explain how you solved this problem.

In a class there is a ratio of 2 boys for every 3 girls. How many children could there be in the class? How many boys and girls could there be in the class? Are there any numbers of boys or girls there could not be? Explain how you know.

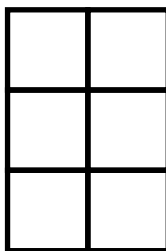
I have multiplied two fractions to give me an answer of $\frac{1}{8}$.
What could the two fractions have been? Find different ways of doing it.

There are 25 children in the lunch queue, including Nick.

Nick says: 'There are twice as many children in front of me as there are behind me'

How many children are in front of Nick?

Explain why $\frac{3}{4}$ of $\frac{1}{2}$ is the same as $\frac{1}{2}$ of $\frac{3}{4}$.



Here is a grid of squares. Shade some squares black so that the ratio of black squares to white squares is 2:1.
How many different ways can you do it? Find them all.

This pie chart shows how the children in Class 6 best like their potatoes cooked.

32 children took part in the survey.

Look at the four statements below.

Which statements are true?

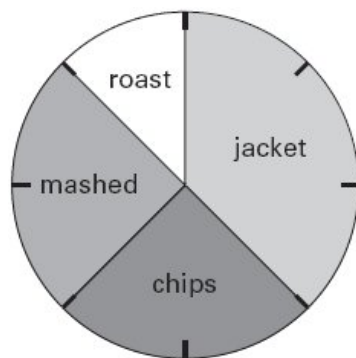
Explain how you know.

10 children like chips best.

25% of the children like mashed potatoes best.

$\frac{1}{5}$ of the children like roast potatoes best.

12 children like jacket potatoes best.



Continue this pattern. What do you notice?

$\frac{1}{3} \div 2 = \frac{1}{6}$ $\frac{1}{6} \div 2 = \frac{1}{12}$ $\frac{1}{12} \div 2 = \frac{1}{24}$

Contextual Learning

Fractions skills can also be emphasised when focusing on real life problems including measurement. Would children rather share $\frac{1}{2}$ of a pizza with 2 people or $\frac{3}{4}$ of a pizza with 4 people?

Measurement of area and perimeter is strongly linked to work with fractions, ratio and proportion; what proportion of the playground needs to be set aside for ball games?

Teachers should select from different contexts for children to explore proportion through scaling up and down.



Ratios can be seen around us in the real world. How many ratio and proportion questions can be asked related to this photo?

Children should also consider ratio as unequal sharing and grouping, using real life contexts such as recipes. A recipe for 3 people needs 75 g of butter.

How much butter do you need for 2 people?

Assessment

Peanuts cost 60p for 100 grams. What is the cost of 350 grams of peanuts?

Raisins cost 80p for 100 grams. Jack pays £2 for a bag of raisins. How many grams of raisins does he get?

In a country dance there are 3 boys and 2 girls in every line. 42 boys take part in the dance. How many girls take part? For a different dance there are 45 children. How many boys are there?

An adult polar bear has a mass three times the mass of a baby elephant. If their combined mass is 700kg, what is the mass of the polar bear?

In a class, 18 of the children are girls. A quarter of the children in the class are boys. Altogether, how many children are there in the class?

A gardener plants tulip bulbs in a flower bed. She plants 3 red bulbs for every 4 white bulbs. She plants 60 red bulbs. How bulbs are planted in total?



This map has a scale of 1 cm to 6 km. The road from Ridlington to Carborough measured on the map is 6.6 cm long. What is the length of the road in kilometres?