All Saints C of E Primary School

Year 5 Fractions, Decimals and Percentages

By the end of Year Five, children have been taught to:

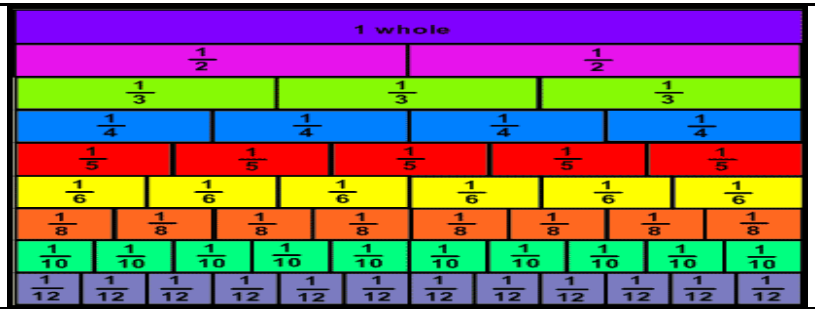
<table>
<tr><th>Objective</th><th>Why is it important? Things to watch out for! Taught strategies</th></tr>
<tr><td>recognise mixed numbers and improper fractions and convert from one form to the other</td><td>Mixed numbers refer to whole numbers and fractions for example: $1\frac{3}{4}$

Improper fractions have been called many things, such as; top heavy fraction or vulgar fractions. However, the main thing to remember is that the denominator is greater than the numerator, for example: $\frac{9}{4}$

Generally, we then turn an improper fraction into a proper fraction by dividing 4 into 9 which goes two times, thus creating a mixed number of $2\frac{1}{4}$.</td></tr>
<tr><td>identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths</td><td>Equivalent fractions build heavily on visual images, as well as children's ability to spot patterns and relationships.
For example, ½ is equivalent to 2/4. When asking children what they notice, they often say that 'the numerator in a half is double the numerator in the quarters', this can also be said for the denominator. Alternatively, this can be said that the numertor in the quarter's fraction is half the numerator in the half written fraction. The link between doubles and halves in these fractions is clear, given the right learning opportunites. Using this doubling and halving approach can be used for equivalence. The main thing is whatever we do to the numerator, the same is done to the denominator ½= 2/4 4/8 8/16 …. Likewise 1/4 2/8 4/16…….

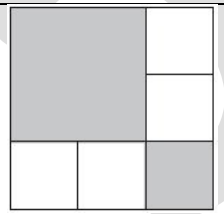
The key to recognising equivalent fractions and ultimately the difference in children being successful, hinges very heavily on them knowing times tables facts.
Example problem: Circle the three equivalent fractions.
<table>
<tr><td>$\frac{12}{36}$</td><td>$\frac{25}{100}$</td><td>$\frac{1}{4}$</td><td>$\frac{1}{3}$</td><td>$\frac{5}{20}$</td><td>Children would need to use their times tables knowledge to reduce the fractions to their simplest form, in order to find the equivalent fractions.</td></tr>
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</td></tr>
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Here is a chocolate bar.
William eats 3 pieces and Amber eats 2 pieces. What fraction of the chocolate bar remains?



The diagram is made of squares. What fraction of the diagram is shaded?

Karen makes a fraction using two number cards.



She says, ***'My fraction is equivalent to*** $\frac{1}{2}$ ***One of the number cards is 6'***

What could Karen's fraction be? Give both possible answers.

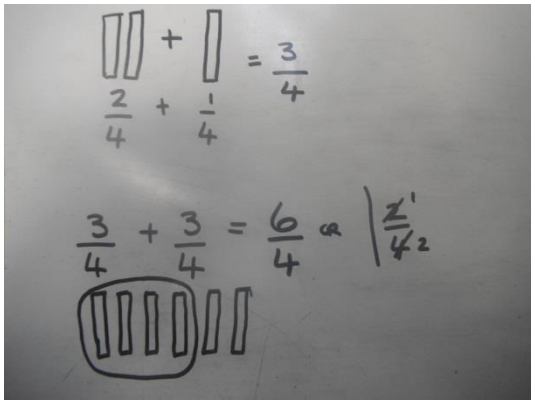
$\frac{\square}{\square}$ or $\frac{\square}{\square}$

Stefan has a bag that contains 3 blue marbles and 5 red marbles only.
What fraction of the marbles in the bag are blue?
Stefan adds one blue marble and one red marble to the bag.
What fraction of the marbles in the bag are blue now?

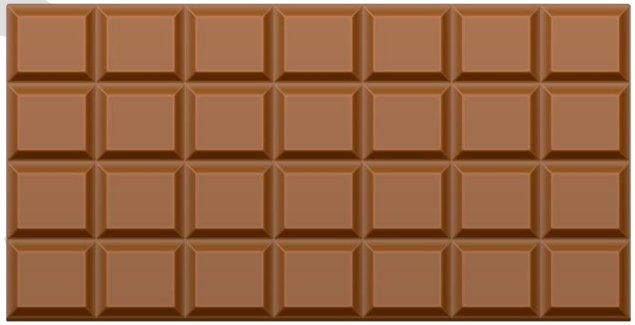
add and subtract fractions with the same denominator and multiples of the same number	In Year 3 and Year 4, children are introduced to adding and subtracting fractions with the same denominator. When moving on in Year 5, we look at more complex calculations where whole numbers and fractions are used, improper fractions and fractions with 2 digit denominators. Maths has its own specialised language, the *numerator* and *denominator* being some words that either we know or we don't. The words do not give children any clue as to what they mean or their orientation to each other in the fraction. The *denominator* is the amount of parts the whole has been cut into and the *numerator* is the amount of parts we have. Through practical activities and other ways of making the words memorable, is the only way to reinforce the meaning of the words. Using silly voices or creating images to make it memorable is a way that can work for some children. Darthvader (with the voice) splitting the whole in half with his light saber is one thing to try if we are feeling theatrical.

Year 5









Here are some common errors children sometimes make when adding and subtracting fractions with the same denominator:

- children add/subtract the denominators, as well as the numerators
- children put the denominator where the numerator should be when showing the pictorial representation as a number sentence

Example problem

Chiz and Caroline each had two sandwiches of the same size. Chiz ate $1\frac{1}{2}$ of his sandwiches. Caroline ate $\frac{5}{4}$ of her sandwiches. Draw diagrams to show how much Chiz and Caroline each ate. Who ate more? How much more?	The answer is $1\frac{9}{12}$. What is the question? Using this type of open task allows children to access the task at their level and develop their understanding through mathematical play. Things children may jot down:

$1\frac{9}{12} = 1\frac{3}{4}$	$1\frac{9}{12} = \frac{21}{12}$	$\frac{7}{12} + \frac{7}{12} + \frac{7}{12} = \frac{21}{12}$
$3 - \frac{15}{12} = 1\frac{9}{12}$		

multiply fractions by whole numbers

When multiplying fractions by a whole number, we revert to using equipment and real life resources again to develop understanding. The key factor with this is remembering that multiplication means lots of.

$4 \times \frac{1}{3} =$ is the same as $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = \frac{4}{3}$ we then convert the improper fraction $\frac{4}{3}$ to $1\frac{1}{3}$

When multiplying fractions by a whole number, we revert to what children are familiar with, which is repeated addition to develop the foundations for multiplying fractions.

$4 \times \frac{2}{3} = \frac{8}{3}$ we then convert the improper fraction to $2\frac{2}{3}$. We can also use diagrams to help develop understanding.



Once children can demonstrate confidence and understanding when multiplying fractions, we can move onto more formal strategies.

$4 \times \frac{2}{3} = \frac{4}{1} \times \frac{2}{3} = \frac{4 \times 2}{1 \times 3} = \frac{8}{3}$ (convert from improper) $2\frac{2}{3}$

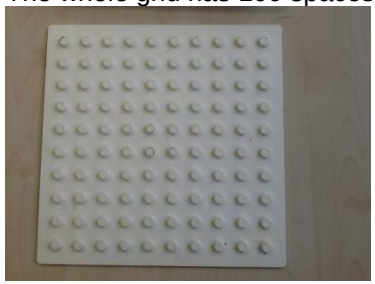
Example problem:

Graham is serving pizzas at a party. Each person is given $\frac{3}{}$ of a pizza. Graham has six pizzas. How many people can he serve?

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read and write decimal numbers as fractions (e.g. 0.71 = 71/100

The whole grid has 100 spaces.

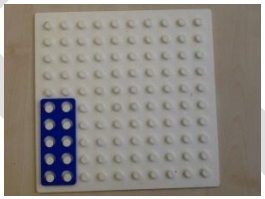


Each blue piece of Numicon will fill 10 spaces.



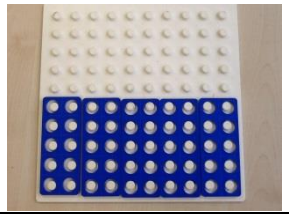
One piece of blue Numicon is worth one tenth and is covering ten out of 100 spaces.

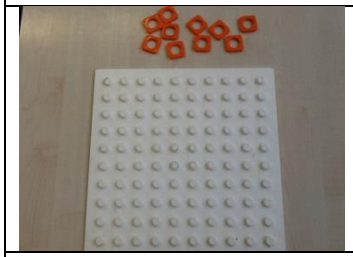
1/10 = 0.1

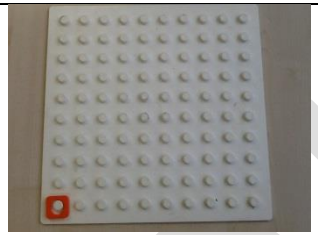


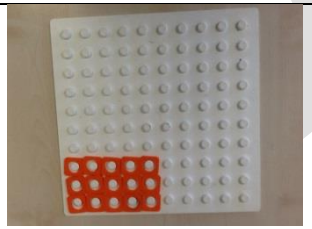
Five blue pieces of Numicon are coverin five tenths of the whole grid.

5/10 = 0.5 - which is also equivalent to 1/2









One orange piece of Numicon has an individual value of 1.

One piece of Numicon is covering one space out of 100.

1/100 = 0.01

Fifteen pieces of Numicon are covering fifteen out of 100.

15/100 = 0.15

0.15 partitioned is one tenth and five hundredths but together is called fifteen hundredths.

Using Numicon and other resources enables children to really understand the value of each digit in a decimal value, as well as relating it to equivalent fractions.

When children have a clear visual image of the value, we can use other structures to help develop understanding, such as; place value grids.

Examples of problems

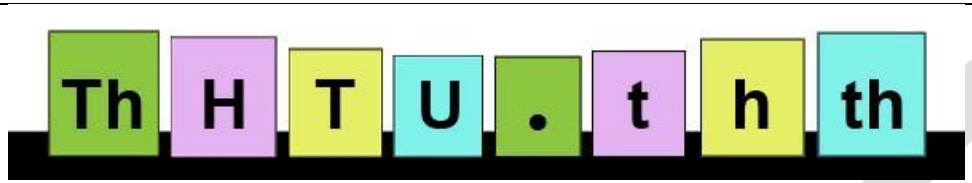
Write the answers as decimals

4/10 + 5/100 = 0.45

6/10 + 9/100 + 6/1000 = 0.696

6/10 + 16/100 = 0.76

read, write, order and compare numbers with up to three decimal places
tenths, hundredths and thousandths



Reading decimals is slightly different than reading whole numbers for example:

0.25 we would say "nought point two five, not nought point twenty five"

Writing decimals in response to questions like 'Show me what 4 hundredths would look like as a decimal on your whiteboard' calls on children to draw on their understanding of the value of digits and position of the digit. Some possible responses:

H	T	U	•	t	h	th	
4	0	0	•				no
		0	•	0	400		no
		0	•	4	0	0	no
		0	•	0	4		yes

It is crucial that children have created a mental image of the relative size and value of four hundredths. The responses above demonstrate how some children can represent four hundredths.

Comparing decimals can challenge children's conceptual understanding of place value. However, if they have spent time using equipment as above and remember to think things through, they can quickly recognise and order values.

Order these values:

0.4 0.45 4.5 4.005 0.4005 0.405 0.004 4

The key to these types of tasks is identifying the largest value or the smallest value first. In this case it is 4.5 and 0.004 and then building from that. Sometimes writing values on a place value grid can help clarify the value.

Common errors

- Children often think that the greater the amount of digits, the larger the value

Year 5

Find 50%, 25% and 75% off a given price or quantity

When solving problems or finding percentages of amounts, we relate children back to what they know from previous learning, namely equivalent fractions.

fraction	percentage	**Finding percentages of amounts**
$\frac{50}{100} = \frac{1}{2}$	50%	Divide the amount by 2 because 50% is equivalent to a half.
$\frac{25}{100} = \frac{1}{4}$	25%	Divide the amount by 4 because 25% is equivalent to a quarter .
$\frac{75}{100} = \frac{3}{4}$	75%	Divide the amount by 4 because one quarter is equivalent is 25%, however it is 75% so we then multiply the answer by 3.

Examples of problems;

Krysia wanted to buy a coat that cost £80. She saw the coat on sale in one shop at $\frac{1}{5}$ off. She saw the same coat on sale in another shop at 25% off. Which shop has the coat at a cheaper price? Explain your reasoning.

Hassan scores 40 out of 80 in a test. Kate scores 40% in the same test.
Who has the higher score? Circle Hassan or Kate. Explain how you know.

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