

Fractions, Decimals and Percentages

Notes and common misconceptions

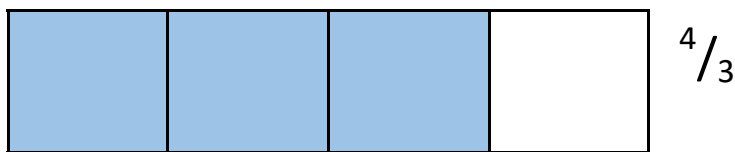
Children develop an early understanding of parts of a whole. The concept of splitting a whole into two halves is a small cognitive step beyond.

Common misconceptions:

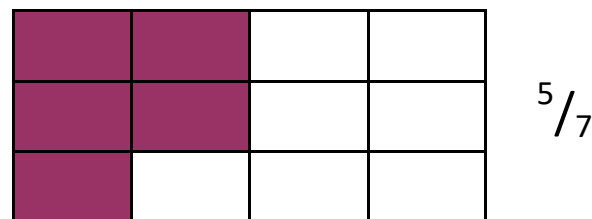
Unequal parts



Inverting numerator and denominator e.g.



Using unused section, rather than total, as denominator e.g.

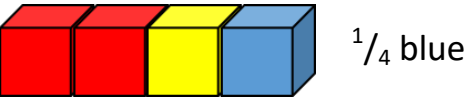
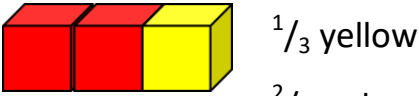
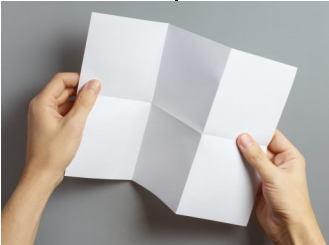
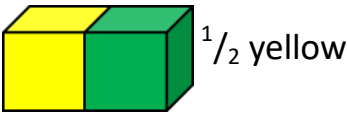
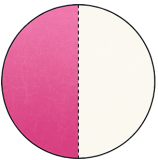
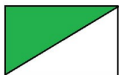
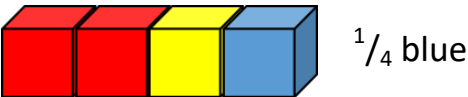
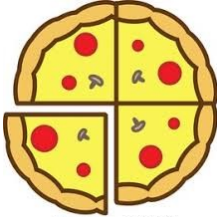
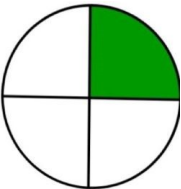


Notation errors:

Failure to place numerator above denominator— $3/4 \times 3/4 \times 3/4 \times \frac{3}{4} \checkmark \frac{3}{4} \checkmark$

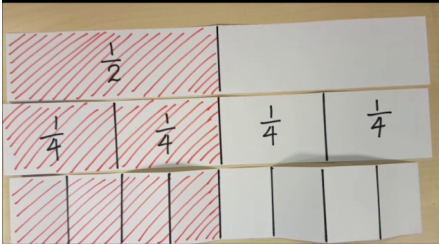
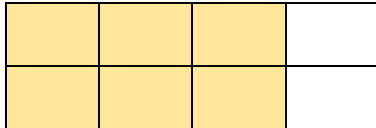
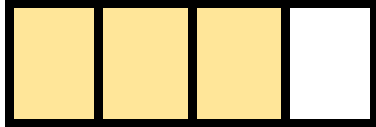
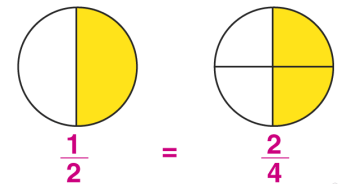
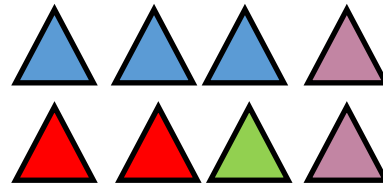
Please note: *Fractions, Decimals and Percentages are closely intertwined with the concepts of multiplication and division and are crucial to the use of money and time. Thus this policy should be used in conjunction with the appropriate Division, Multiplication and Money & Time policies.*

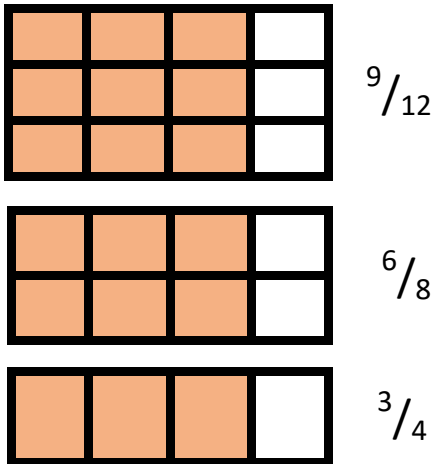
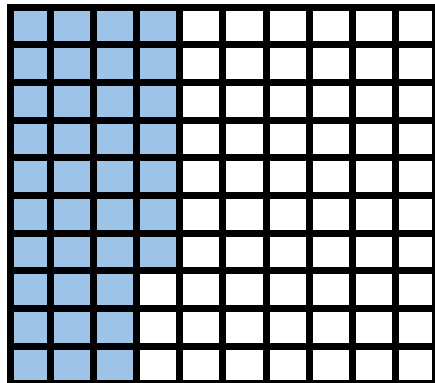
Fractions, Decimals and Percentages

Skill	Concrete	Pictorial	Abstract
Pupil understands that a fraction can describe a part of a whole. 	 $\frac{1}{4}$ blue  $\frac{1}{3}$ yellow $\frac{2}{3}$ red  		<i>e.g. Show different images of fractions and get the pupil to talk about what is the same and what is different about the images.</i> <i>Show a range of shapes. Can the child distinguish which shapes have been folded into equal parts.?</i>
Pupil recognises, finds and names a half as one of two equal parts of an object, shape or quantity (including measure).	 $\frac{1}{2}$ yellow  $\frac{1}{2}$ chocolate 	     	<i>e.g. Find the glass that is half full. Empty this cup so that there is half left. Give the pupil a square piece of card and ask them to fold in half. Repeat with other shapes. Can you make 2 equal teams from a group of 8 children?</i>
Pupil recognises, finds and names a quarter as one of four equal parts of a whole object, shape or quantity.	 $\frac{1}{4}$ blue	 	

Skill	Concrete	Pictorial	Abstract
Pupil recognises, finds, names and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{2}{3}$, and $\frac{2}{4}$ of a length, shape, set of objects or quantity	How many is: half of the set? a quarter of the set? three quarters of the set? a third of the set? How many is: half of the plums? a quarter of the plums? three quarters of the plums?	Shade $\frac{1}{2}$ Shade $\frac{1}{4}$ What fraction? $\frac{?}{9}$ $\frac{5}{?}$	e.g. Adrian has a set of 12 pencils. How many is: half of the set? a quarter of the set? three quarters of the set? a third of the set? If there are 24 cherries and they are shared equally between two people, how many cherries will each person get? What if there are 4 people? What if there are 3 people? Shade more squares so that exactly half of the shape is shaded: Show a number of partly shaded shapes. Which shapes have more than a quarter, a third or a half of them shaded? Have a selection of different lengths, such as string or ribbon and get the pupil to show you a quarter, a third or a half of the length

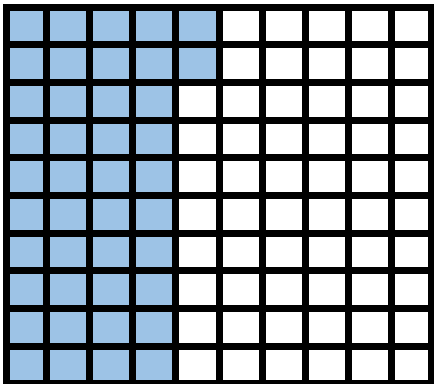
Skill	Concrete	Pictorial	Abstract
Pupil can derive and use doubles and halves of simple two-digit numbers. They understand halving as a way of 'undoing' doubling and vice versa. C.f. Division policy Pupil understands that finding a fraction of an amount relates to division Pupil recognises, finds and writes fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.	11  double  half 22 Choose $\frac{1}{6}$  Choose $\frac{5}{6}$	12 → double → 24 24 ← half ← 12 12 → x2 → 24 24 ← ÷2 ← 12	e.g. When I doubled a number the answer was 18. Which number did I double? There are 28 children in a class. Half of them are girls, how many are boys? Write the missing number: $4 \rightarrow \text{double and add } 5 \rightarrow 13$ $7 \rightarrow \text{double and add } 5 \rightarrow c$ Double 20, 42, 34, 53 Halve 16, 24, 42, 68 e.g. A chocolate bar has 15 pieces. I give $\frac{1}{3}$ of the bar to a friend. How many pieces of chocolate do I have left? What calculation would you do to find $\frac{1}{5}$ of 25? What is $\frac{3}{4}$ of 16? There are 24 sweets in a tube. of them $\frac{1}{4}$ are red, $\frac{1}{3}$ of them are orange. The rest are yellow. How many sets are yellow?

Skill	Concrete	Pictorial	Abstract
Pupil recognises and shows, using diagrams, equivalent fractions with small denominators. Pupil recognises, finds and writes fractions of a discrete set of objects including those with a range of numerators and denominators. Pupil adds and subtracts fractions with the same denominator (using diagrams).	<i>Take a sheet of paper. Fold it in half, in half again and in half again. Open up the sheet and colour in 2 sections. What fraction of the paper have you shaded? Can you find two ways of writing the fraction?</i>   $\frac{2}{9}$ red	  EQUIVALENT FRACTIONS  $\frac{1}{2} = \frac{2}{4}$ $\frac{3}{8}$ blue   $\frac{2}{8} + \frac{3}{8} = \frac{5}{8}$	<i>e.g. Suggest fractions that are smaller than $\frac{1}{2}$. Explain how you know.</i> <i>e.g. What is $\frac{3}{5}$ of 40? What is three tenths of 60? Find different ways to complete:</i> $\frac{\square}{\square}$ of $\square = 15$ <i>Calculate the following:</i> $\frac{1}{5} + \frac{3}{5} =$ $\frac{2}{3} - \frac{1}{3} =$

Skill	Concrete	Pictorial	Abstract
Pupil recognises and shows, using diagrams, families of common equivalent fractions.	 Fold $\frac{1}{2}$ then again for $\frac{1}{4}$ then again for $\frac{1}{8}$ - colour half in and see equivalents	 $\frac{9}{12}$ $\frac{6}{8}$ $\frac{3}{4}$	e.g. Andrew makes a fraction using two number cards. He says, 'My fraction is equivalent to $\frac{3}{4}$' One of the number cards is 6. What would the other number be? Show how you know by using diagrams.
Pupil recognises and writes decimal equivalents of any number of tenths or hundredths.	 0.37 = $\frac{37}{100}$ Fill in 100-squares Half of 9 = 4.5 <u>Half Of 0.8 = 0.4</u> Half of 9.8 = 4.9	What is the decimal equivalent for: $\frac{1}{10}$ $\frac{7}{10}$ $\frac{17}{100}$ $\frac{75}{100}$ $\frac{1}{2}$	What is the decimal equivalent for: $\frac{1}{10}$ $\frac{7}{10}$ $\frac{17}{100}$ $\frac{75}{100}$ $\frac{1}{2}$
Pupil can use partitioning to double and halve any number, including decimals to one decimal place. c.f division policy			e.g. What is half: 6.4, 1270, 9.8, 6322? What is double: 12.4, 3520, 4.7, 2468

Skill	Concrete	Pictorial	Abstract
Pupil can write amounts of money using decimal notation. Pupil recognises that one hundred 1p coins equal £1 and that each coin is $\frac{1}{100}$ of £1. <i>c.f. Time & Money policy</i>			<i>e.g. Write the following amounts of money using decimal notation:</i> <i>Four pounds and thirty six pence</i> <i>Six pounds and seven pence</i> <i>Ten pounds and eighteen pence</i>

This takes us to the end of PIVATS Milestone 4

Skill	Concrete	Pictorial	Abstract																																				
Pupil recognises that percent is simply a fraction out of 100 Pupil recognises % notation Pupil can convert between percentage, fractions and decimals (out of 100) Pupil recognises common FDP equivalents		 42% = 0.42 = $\frac{42}{100}$ Fill in 100-squares	Fill in the spaces: 35% = $\frac{[]}{100}$ $\frac{64}{100}$ = []% <table><tr><th>%</th><th>Fraction</th><th>Decimal</th></tr><tr><td>10%</td><td>$\frac{10}{100}$</td><td></td></tr><tr><td>28%</td><td></td><td>0.28</td></tr><tr><td>62%</td><td></td><td>0.62</td></tr><tr><td></td><td>$\frac{99}{100}$</td><td></td></tr></table> <table><tr><th>%</th><th>Fraction</th><th>Decimal</th></tr><tr><td>50%</td><td>$\frac{1}{2}$</td><td>0.5</td></tr><tr><td>25%</td><td></td><td>0.25</td></tr><tr><td>75%</td><td>$\frac{3}{4}$</td><td></td></tr><tr><td>10%</td><td></td><td></td></tr><tr><td>20%</td><td>$\frac{1}{5}$</td><td></td></tr><tr><td>100%</td><td>1</td><td>1</td></tr></table>	%	Fraction	Decimal	10%	$\frac{10}{100}$		28%		0.28	62%		0.62		$\frac{99}{100}$		%	Fraction	Decimal	50%	$\frac{1}{2}$	0.5	25%		0.25	75%	$\frac{3}{4}$		10%			20%	$\frac{1}{5}$		100%	1	1
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