

# *Fraction, Decimal & Percentage Progression*



**Life in all its fullness!**

Images taken from:

- NCETM
- White Rose


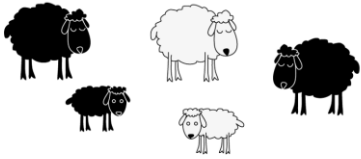

*(UPDATED 20/07/2022)*

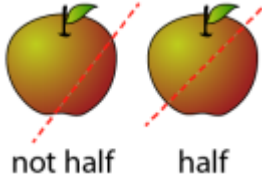

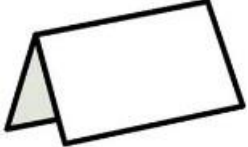

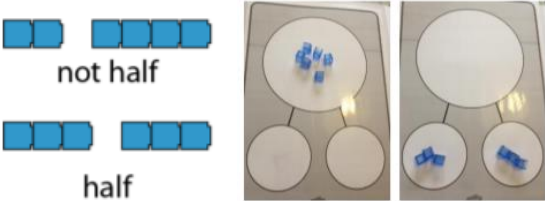
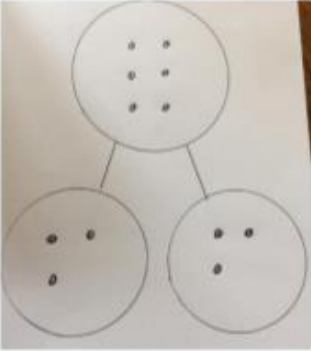
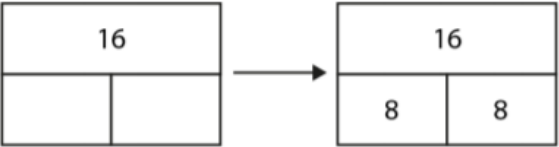


# YEAR 1



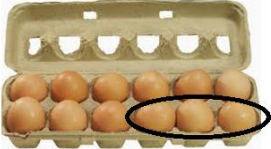
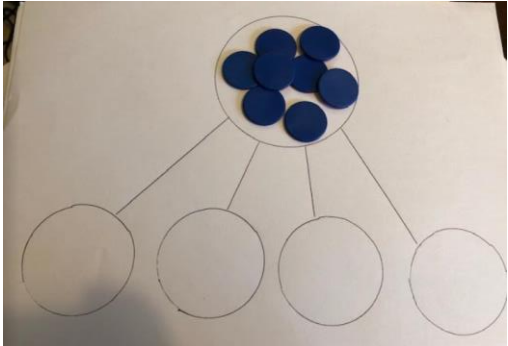
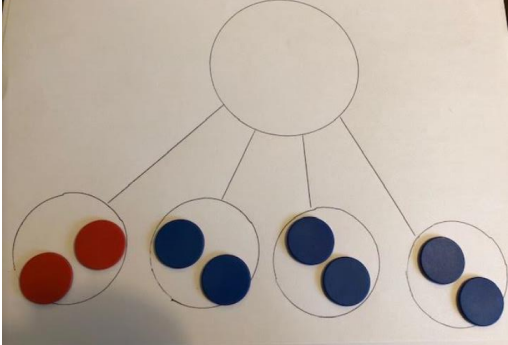
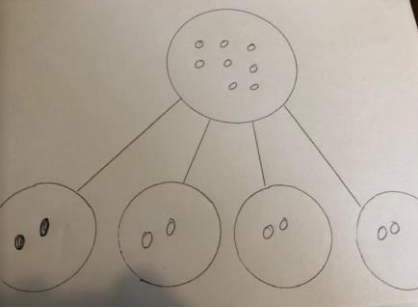
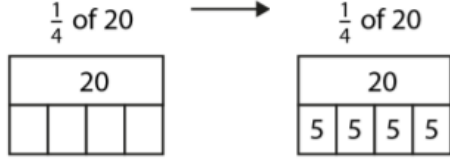
## National Curriculum Objectives

- recognise, find and name a half as one of two equal parts of an object, shape or quantity
- recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.

<b>Vocabulary</b> <i>(new vocabulary for year in bold/italic)</i>	<b>Stem Sentences</b> <i>(new stem sentence for year in bold/italic)</i>
<i>one half, halves, one quarter, quarters, equal, two, four, parts, equal parts, divide into 2, split, share, whole. fraction</i>	<i>The whole is split equally into _____ parts and _____ parts are shaded.</i>  <i>Half of ____ is _____</i>  <i>Quarter of ____ is _____</i>

Small step	Concrete	Pictorial	Abstract
Part-whole relationship	Use small toys    If the car is the whole, the wheel is one part of the whole	  If the herd is the whole, the black sheep are one part of the whole  <b>Whole</b>   <b>Part</b> →  If the circle is the whole, this (red part) is one part of the whole.	

Small step	Concrete	Pictorial	Abstract
Find $\frac{1}{2}$ of an object	Share objects equally between two. 	Use pictures to represent the things e.g. circles to represent the apples. 	
Find $\frac{1}{2}$ of a shape	Fold a piece of paper into halves. 		
Find $\frac{1}{2}$ of a quantity	Share objects into 2 equal groups. Build a tower half of the size of the first. Create a pattern with $\frac{1}{2}$ of the objects one colour/shape and the rest different. 	 (Or use bar model with dots)	
Find $\frac{1}{4}$ of an object	Share objects equally between four. 	Use pictures to represent the things e.g. squares to represent toast 	


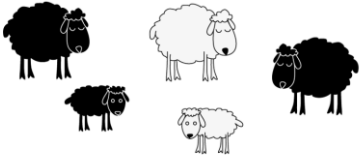

Small step	Concrete	Pictorial	Abstract
Find $\frac{1}{4}$ of a shape	Fold a piece of paper into quarters. 		
Find $\frac{1}{4}$ of a quantity	Share objects into 4 equal groups. Build a tower quarter of the size of the first. Create a pattern with $\frac{1}{4}$ of the objects one colour/shape and the rest different. Using part-whole model with counters   	Part whole model or bar model with dots 	Using part-whole model or bars 

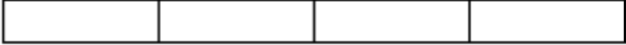
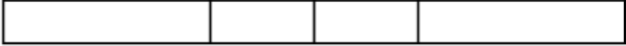
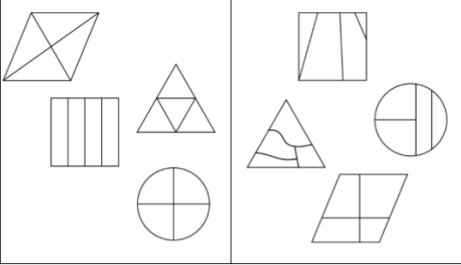
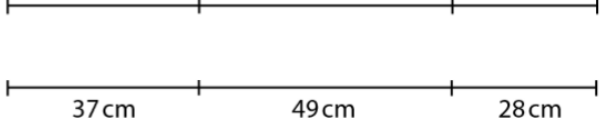
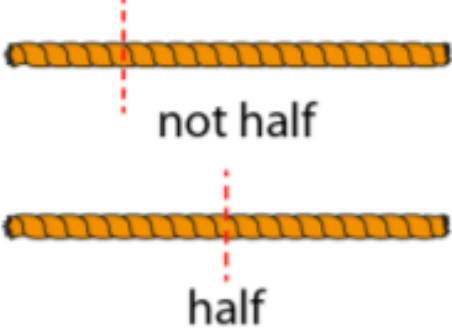
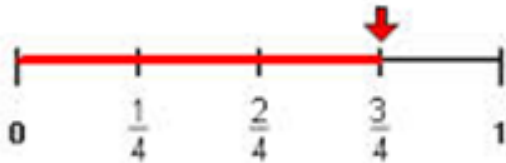
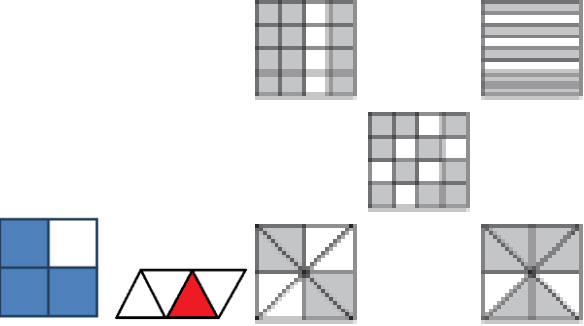
# YEAR 2

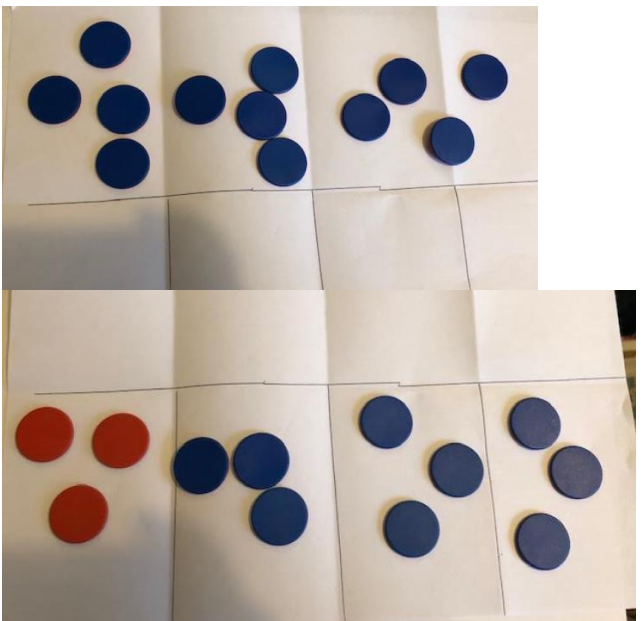
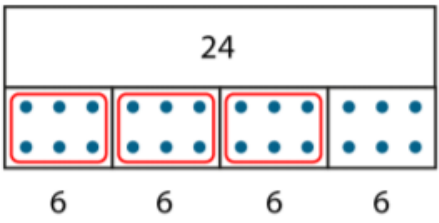
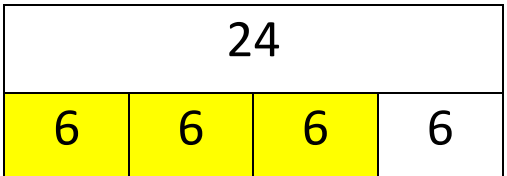
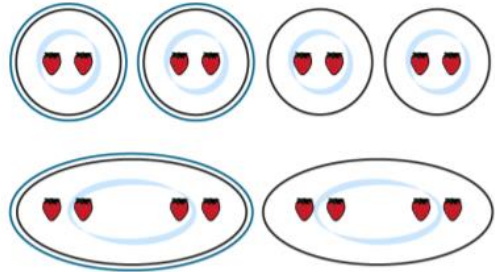
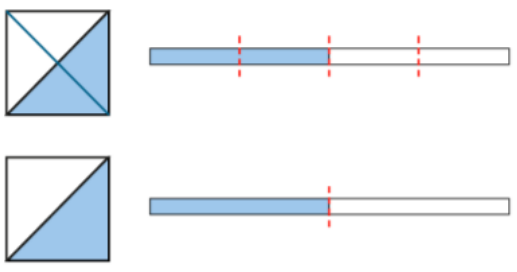
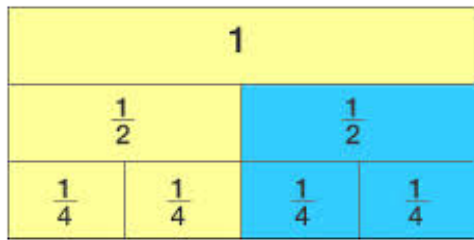
## National Curriculum Objectives

- recognise, find, name and write fractions  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{3}$ ,  $\frac{3}{4}$  of a length, shape, set of objects or quantity
- write simple fractions for example,  $\frac{1}{2}$  of 6 = 3 and recognise the equivalence of  $\frac{2}{4}$  and  $\frac{1}{2}$ .

Vocabulary <i>(new vocabulary for year in bold/italic)</i>	Stem Sentences <i>(new stem sentence for year in bold/italic)</i>
one half, halves, one quarter, quarters, equal, two, four, parts, equal parts, divide into 2, split, share, whole, fraction <b>numerator (tells you the 'number' of), denominator (nominates or names the fraction), three quarters, equivalent, balance, multiply, divide, division, multiplication</b>	The whole is split equally into _____ parts and _____ parts are shaded. Half of _____ is _____ Quarter of _____ is _____ <b>If a quarter is _____ then the whole is _____</b> <b>The numerator is _____ and the denominator is _____.</b> _____ is equivalent to _____

Small step	Concrete	Pictorial	Abstract
Part-whole relationship	Using small toys  <p>If the children are the whole, the boys are one part of the whole</p>	 <p>If the herd is the whole, the black sheep are one part of the whole</p> <p><b>Whole</b></p>  <p><b>Part</b> →</p> <p>If the circle is the whole, this (red part) is one part of the whole.</p>	

Small step	Concrete	Pictorial	Abstract
Equal/ unequal parts	<p>Provide children with various shapes – cut shapes into equal/ unequal shapes</p> <p>Folding paper:</p>  <ul style="list-style-type: none"> <li>'I have folded my whole length of paper into four equal parts.'</li> </ul>  <ul style="list-style-type: none"> <li>'I have folded my whole length of paper into four unequal parts.'</li> </ul>	 <p>'Are the parts of equal size?'</p> 	
Find $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{1}{3}$ , $\frac{3}{4}$ of a length			<p><u><math>\frac{1}{2}</math> of 6cm is 3m</u></p> <p><math>6 \div 2 = 3</math></p>
Find $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{1}{3}$ , $\frac{3}{4}$ of a shape	<p>Folding shapes/ pieces of paper into equal parts. Breaking chocolate bars</p>		

Small step	Concrete	Pictorial	Abstract
<p>Find <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math>, <math>\frac{3}{4}</math> of a set</p> <p>Find <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math>, <math>\frac{3}{4}</math> of a quantity</p>	<p>Using cubes or objects with part-whole or Singapore bar model</p> 	<p>Drawing dots to calculate <math>\frac{3}{4}</math> of 24:</p> 	 <p><math>\frac{3}{4}</math> of 24 is 18</p>
<p>Equivalence of <math>\frac{2}{4}</math> and <math>\frac{1}{2}</math></p>			

# YEAR 3



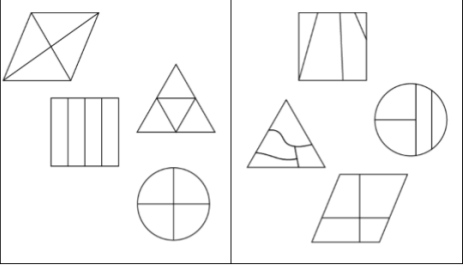
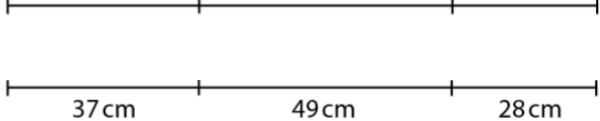
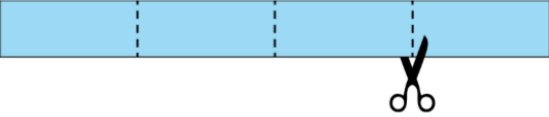
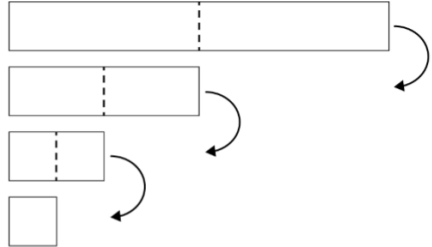
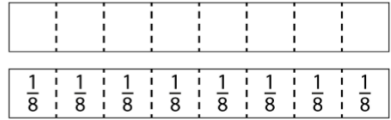

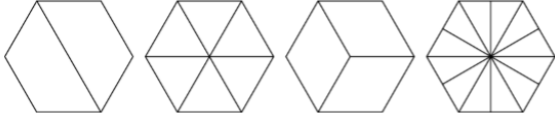
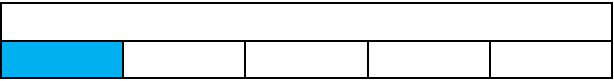

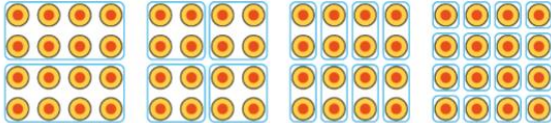
## National Curriculum Objectives

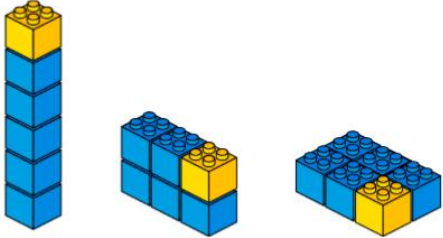

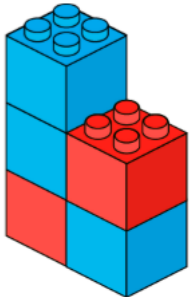


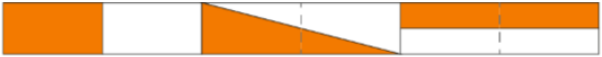
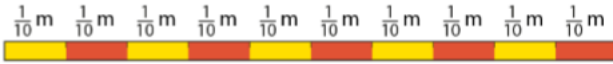

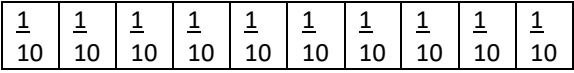
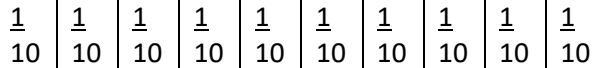
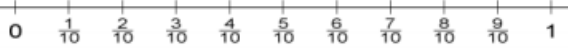
- count up and down in tenths
- recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
- recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators
- recognise and show, using diagrams, equivalent fractions with small denominators
- add and subtract fractions with the same denominator within one whole [for example,  $5/7 + 1/7 = 6/7$ ]
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above.

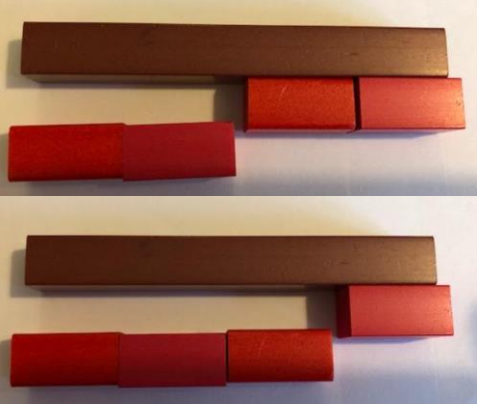
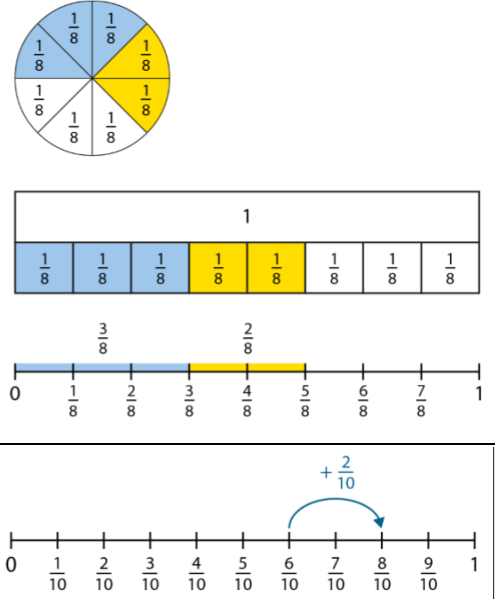
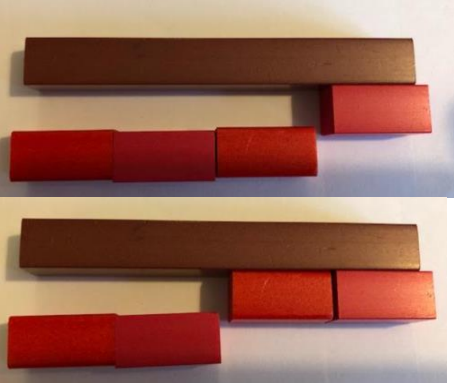
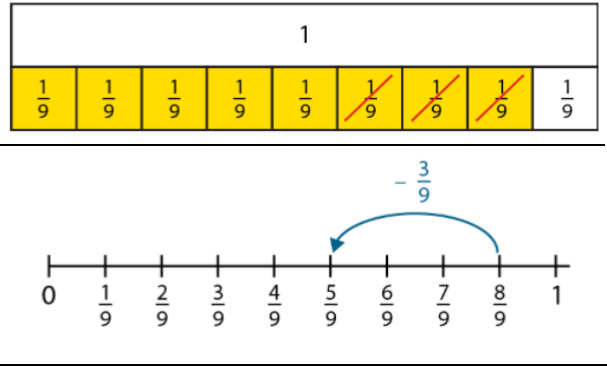
<b>Vocabulary</b> <i>(new vocabulary for year in bold/italic)</i>	<b>Stem Sentences</b> <i>(new stem sentence for year in bold/italic)</i>
one half, halves, one quarter, quarters, equal, two, four, parts, equal parts, divide into 2, split, share, whole, fraction numerator (tells you the 'number' of), denominator (nominates or names the fraction), three quarters, equivalent, balance, multiply, divide, division, multiplication <b><i>fifths, tenths, unit-fraction, non-unit fraction</i></b>	The whole is split equally into ____ parts and ____ parts are shaded. Half of ____ is ____ Quarter of ____ is ____ The numerator is ____ and the denominator is ____. ____ is equivalent to ____ If a quarter is ____ then the whole is ____  <b><i>The value of the ____ is ____ tenths.</i></b> <b><i>If the ____ is the whole, the ____ is one part of the whole</i></b>

Small step	Concrete	Pictorial	Abstract
Part-whole relationship		 <p><i>'If Europe is the whole, then the United Kingdom is part of the whole.'</i></p>	Part-whole relationship – cardinal context (time): <div style="display: flex; justify-content: space-around; align-items: center;"> <span style="background-color: yellow; padding: 2px 5px;">Mon</span> <span style="background-color: yellow; padding: 2px 5px;">Tue</span> <span style="background-color: yellow; padding: 2px 5px;">Wed</span> <span style="background-color: yellow; padding: 2px 5px;">Thu</span> <span style="background-color: yellow; padding: 2px 5px;">Fri</span> <span style="background-color: yellow; padding: 2px 5px;">Sat</span> <span style="background-color: yellow; padding: 2px 5px;">Sun</span> </div> <p><i>'If the week is the whole, then Tuesday is part of the whole.'</i></p>



Small step	Concrete	Pictorial	Abstract
<p>Equal/unequal parts</p>	<p>Provide children with various shapes – cut shapes into equal/ unequal shapes</p> <p>Folding paper:</p>  <ul style="list-style-type: none"> <li>'I have folded my whole length of paper into four equal parts.'</li> </ul>  <ul style="list-style-type: none"> <li>'I have folded my whole length of paper into four unequal parts.'</li> </ul>	 <p>'Are the parts of equal size?'</p> 	
<p>Unit fractions: identifying, representing and comparing</p>	<p>Folding shapes – cutting out a piece</p>    <p>Using Cuisinere rods</p> 	<p>Shapes: Example ..</p>   <p>Linear: Example ..</p>  <p>Cardinal:</p> 	

Small step	Concrete	Pictorial	Abstract
	<p>Set of object/ Flip counters</p> 		
<p>Non-unit fractions</p>	<p>Folding shapes – cut out parts</p> <p>Using cuisiniere rods</p>  <p>Set of objects/ Flip counters</p> 	    	
<p>Tenths – understand and count</p>	<p>Folding paper</p> 	 <p>Using a bar</p>  <p>Numberline</p>	

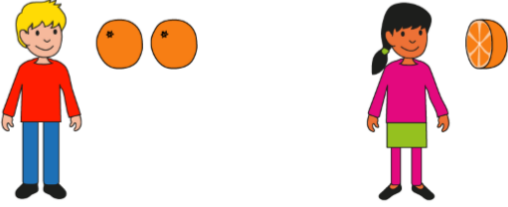
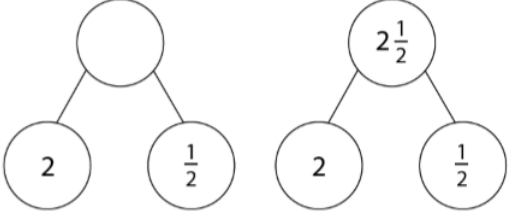
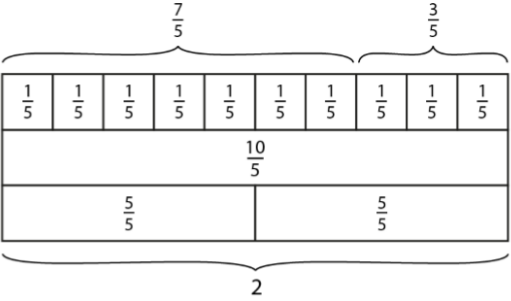
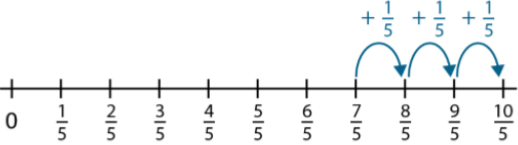
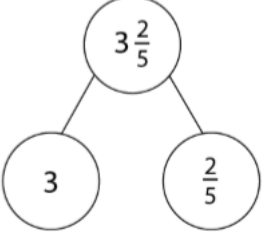
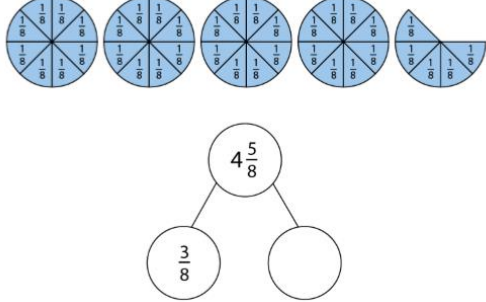
Small step	Concrete	Pictorial	Abstract
Adding within one whole	<p>Using cuisinere rods</p>  <p><math>2/4 + 1/4 = 3/4</math></p>		$\frac{3}{9} + \frac{4}{9} = \frac{7}{9}$
Subtracting within one whole	<p>Using cuisinere rods</p>  <p><math>3/4 - 1/4 = 2/4</math></p>		$\frac{8}{9} - \frac{3}{9} = \frac{5}{9}$

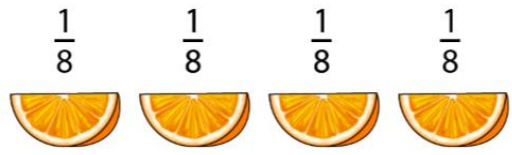
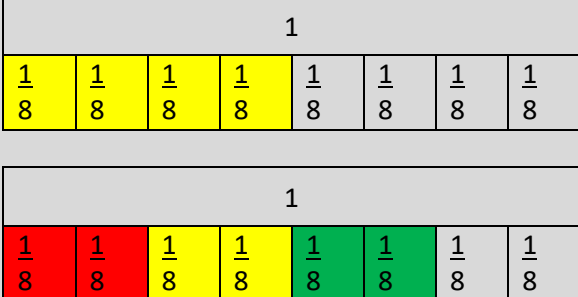
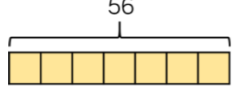
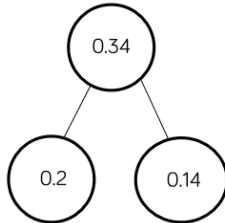
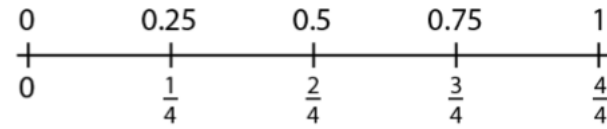

## YEAR 4

### National Curriculum Objectives

- recognise and show, using diagrams, families of common equivalent fractions
- count up and down in hundredths
- recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.
- solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
- add and subtract fractions with the same denominator
- recognise and write decimal equivalents of any number of tenths or hundredths
- recognise and write decimal equivalents to  $4 \frac{1}{10}$ ,  $2 \frac{1}{10}$ ,  $4 \frac{3}{10}$
- find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
- round decimals with one decimal place to the nearest whole number
- compare numbers with the same number of decimal places up to two decimal places
- solve simple measure and money problems involving fractions and decimals to two decimal places.

Vocabulary <i>(new vocabulary for year in bold/italic)</i>	Stem Sentences <i>(new stem sentence for year in bold/italic)</i>
one half, halves, one quarter, quarters, equal, two, four, parts, equal parts, divide into 2, split, share, whole, fraction numerator (tells you the 'number' of), denominator (nominates or names the fraction), three quarters, equivalent, balance, multiply, divide, division, multiplication fifths, tenths, unit-fraction, non-unit fraction <b><i>hundredths, decimal, 'three point six', 'three point seven five'</i></b>	The whole is split equally into _____ parts and _____ parts are shaded. Half of ____ is _____ Quarter of ____ is _____ The numerator is _____ and the denominator is _____. _____ is equivalent to _____ If a quarter is _____ then the whole is _____ If the _____ is the whole, the ____ is one part of the whole  <b><i>The value of the _____ is _____ tenths/hundredths.</i></b>

Small step	Concrete	Pictorial	Abstract
Improper / mixed fractions	<p>"How many oranges do Jonny and Ellen have altogether?"</p> 		
Add fractions with same denominator		<p><math>\frac{7}{5} + \frac{3}{5} = \frac{10}{5} = 2</math></p>  <p><math>\frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5}</math></p> <p><math>\frac{10}{5}</math></p> <p><math>\frac{5}{5} \quad \frac{5}{5}</math></p> <p>2</p> <p><math>+\frac{1}{5} \quad +\frac{1}{5} \quad +\frac{1}{5}</math></p> 	 <p><math>3\frac{2}{5} = 3 + \frac{2}{5}</math>      <math>3\frac{2}{5} = \frac{2}{5} + 3</math></p> <p><math>3 + \frac{2}{5} = 3\frac{2}{5}</math>      <math>\frac{2}{5} + 3 = 3\frac{2}{5}</math></p> <p><math>3\frac{2}{5} - 3 = \frac{2}{5}</math>      <math>\frac{2}{5} = 3\frac{2}{5} - 3</math></p> <p><math>3 = 3\frac{2}{5} - \frac{2}{5}</math>      <math>3\frac{2}{5} - \frac{2}{5} = 3</math></p>
Subtract fractions with same denominator		 <p><math>4\frac{5}{8}</math></p> <p><math>\frac{3}{8}</math></p>	



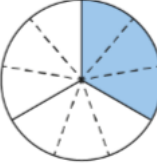
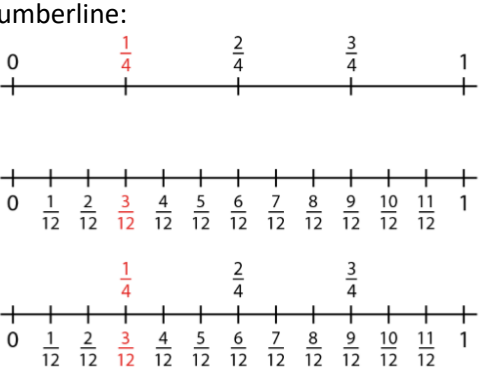
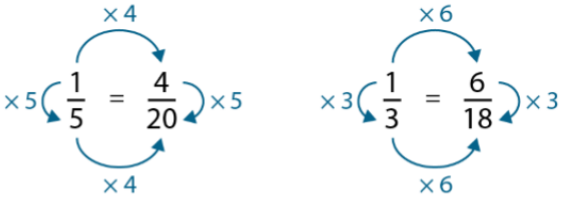
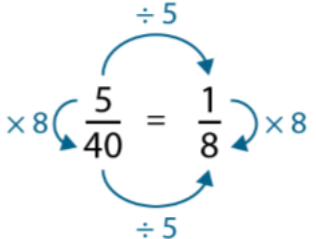
Small step	Concrete	Pictorial	Abstract																										
Multiplying whole numbers and fractions			$4 \times \frac{1}{8}$ $\frac{1}{8} \times 4$ $\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} = 4 \times \frac{1}{8} = \frac{1}{8} \times 4$																										
Calculate fractions of a quantity		$\frac{1}{7} \text{ of } 56 = 56 \div \square$  $\frac{2}{7} \text{ of } 56 \quad \frac{3}{7} \text{ of } 56 \quad \frac{4}{7} \text{ of } 56 \quad \frac{4}{7} \text{ of } 28 \quad \frac{7}{7} \text{ of } 28$																											
decimal equivalents of any number of tenths or hundredths	Using place value counters <table border="1" data-bbox="309 662 743 853"> <thead> <tr> <th>Ones</th> <th>Tenths</th> <th>Hundredths</th> </tr> </thead> <tbody> <tr> <td></td> <td>0.1</td> <td>0.01 0.01</td> </tr> <tr> <td>0</td> <td>1</td> <td>2</td> </tr> </tbody> </table>	Ones	Tenths	Hundredths		0.1	0.01 0.01	0	1	2	Part-whole model  Place Value Grid with circles <table border="1" data-bbox="1265 694 1545 877"> <thead> <tr> <th>Ones</th> <th>Tenths</th> <th>Hundredths</th> </tr> </thead> <tbody> <tr> <td>● ●</td> <td>● ● ●</td> <td></td> </tr> <tr> <td>● ● ●</td> <td></td> <td>● ● ● ●</td> </tr> </tbody> </table>	Ones	Tenths	Hundredths	● ●	● ● ●		● ● ●		● ● ● ●	<table border="1" data-bbox="1590 614 2049 837"> <thead> <tr> <th>T</th> <th>O</th> <th>t</th> <th>h</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>1</td> <td>0</td> <td>9</td> </tr> </tbody> </table> $0.34 = 0.2 + 0.14$	T	O	t	h	2	1	0	9
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recognise and write decimal equivalents to $\frac{1}{4}$ , $\frac{1}{2}$ , $\frac{3}{4}$		Numberline  (see NCETM Y6)																											
Divide by 10 or 100	Place Value Slider or use Place Value Grid with post-its 	Place Value Grid <table border="1" data-bbox="891 1220 1534 1460"> <thead> <tr> <th>T</th> <th>O</th> <th>t</th> <th>h</th> <th>T</th> <th>O</th> <th>t</th> <th>h</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>5</td> <td></td> <td></td> <td>1</td> <td>7</td> <td></td> <td></td> </tr> <tr> <td></td> <td>1</td> <td>5</td> <td></td> <td></td> <td>0</td> <td>1</td> <td>7</td> </tr> </tbody> </table>	T	O	t	h	T	O	t	h	1	5			1	7				1	5			0	1	7	$15 \div 10 = 1.5$ $17 \div 100 = 0.17$		
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	1	5			0	1	7																						

# YEAR 5

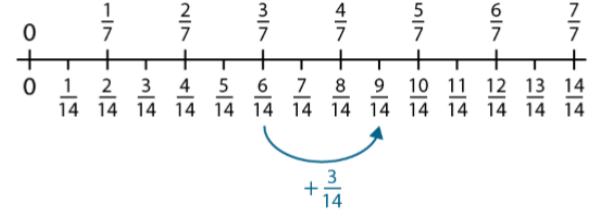
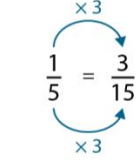
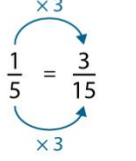
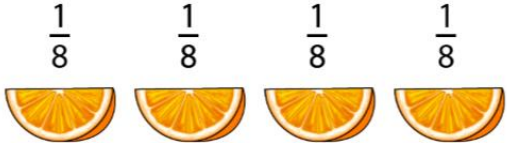
## National Curriculum Objectives

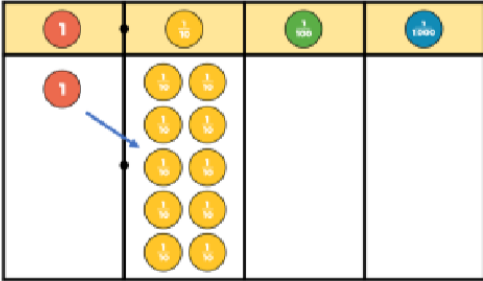
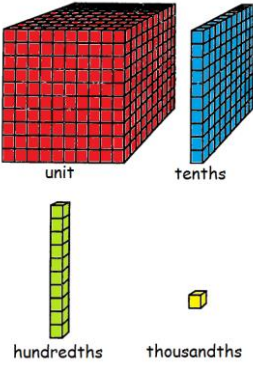
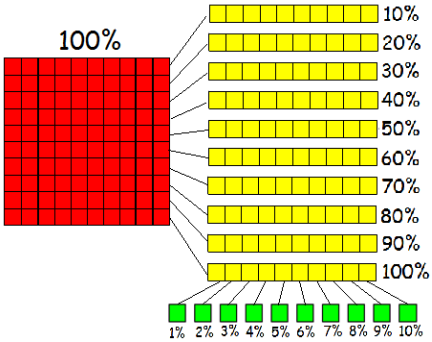
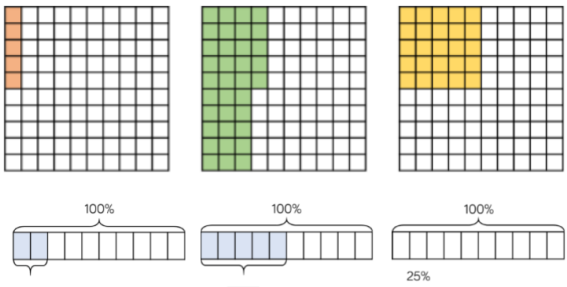
- compare and order fractions whose denominators are all multiples of the same number
- identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements  $> 1$  as a mixed number [for example,  $2/5 + 4/5 = 6/5 = 1 \frac{1}{5}$  ]
- add and subtract fractions with the same denominator and denominators that are multiples of the same number
- multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
- read and write decimal numbers as fractions [for example,  $0.71 = 71/100$ ]
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- round decimals with two decimal places to the nearest whole number and to one decimal place
- read, write, order and compare numbers with up to three decimal places
- solve problems involving number up to three decimal places
- recognise the per cent symbol (%) and understand that per cent relates to ‘number of parts per hundred’, and write percentages as a fraction with denominator 100, and as a decimal
- solve problems which require knowing percentage and decimal equivalents of  $1/2$  ,  $1/4$  ,  $1/5$  ,  $2/5$  ,  $4/5$  and those fractions with a denominator of a multiple of 10 or 25

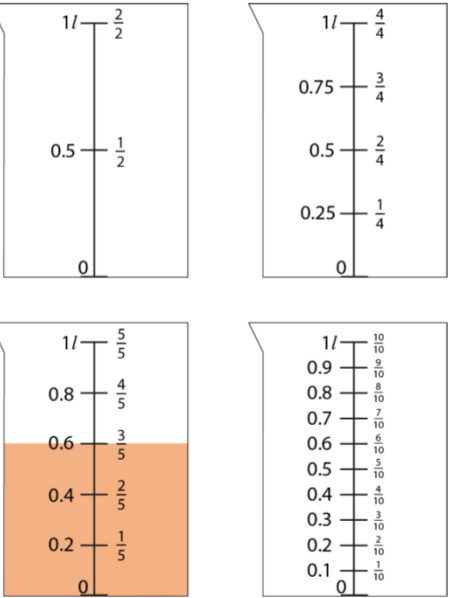
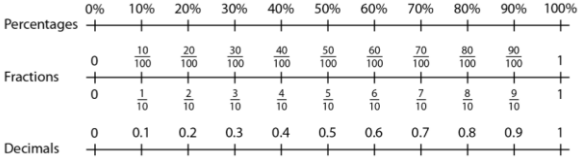
Vocabulary <i>(new vocabulary for year in bold/italic)</i>	Stem Sentences <i>(new stem sentence for year in bold/italic)</i>
one half, halves, one quarter, quarters, equal, two, four, parts, equal parts, divide into 2, split, share, whole, fraction numerator (tells you the ‘number’ of), denominator (nominates or names the fraction), three quarters, equivalent, balance, multiply, divide, division, multiplication fifths, tenths, unit-fraction, non-unit fraction hundredths, decimal, ‘three point six’, ‘three point seven five) <b>percent, percentage, mixed number, improper</b>	The whole is split equally into _____ parts and _____ parts are shaded. Half of _____ is _____ Quarter of _____ is _____ If a quarter is _____ then the whole is _____ The numerator is _____ and the denominator is _____. _____ is equivalent to _____ If the _____ is the whole, the _____ is one part of the whole The value of the _____ is _____ tenths/hundredths.

Small step	Concrete	Pictorial	Abstract
Equivalent and simplifying	Using Cuisenaire Rods or fraction wall 	Bar model:  Shapes:  $\frac{1}{3} = \square$ Numberline: 	Equivalent:  Simplifying: 



Small step	Concrete	Pictorial	Abstract																																												
Add and subtract with common denominators		<p>Using bar model:</p> <table border="1" data-bbox="904 169 1505 392"> <tr> <td colspan="2"><math>\frac{1}{3}</math></td> <td colspan="2"><math>\frac{1}{3}</math></td> <td colspan="2"><math>\frac{1}{3}</math></td> </tr> <tr> <td><math>\frac{1}{6}</math></td><td><math>\frac{1}{6}</math></td> <td><math>\frac{1}{6}</math></td><td><math>\frac{1}{6}</math></td> <td><math>\frac{1}{6}</math></td><td><math>\frac{1}{6}</math></td> </tr> <tr> <td><math>\frac{1}{6}</math></td><td><math>\frac{1}{6}</math></td> <td><math>\frac{1}{6}</math></td><td><math>\frac{1}{6}</math></td> <td><math>\frac{1}{6}</math></td><td><math>\frac{1}{6}</math></td> </tr> </table> <p>Using a numberline:</p> 	$\frac{1}{3}$		$\frac{1}{3}$		$\frac{1}{3}$		$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	 $\frac{1}{5} + \frac{1}{15} =$  $\frac{3}{15} + \frac{1}{15} = \frac{4}{15}$																										
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Multiplying whole numbers and fractions  <i>(see NCETM Y4)</i>		<table border="1" data-bbox="904 726 1505 861"> <tr><td colspan="8">1</td></tr> <tr> <td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td> </tr> </table> <table border="1" data-bbox="904 893 1505 1029"> <tr><td colspan="8">1</td></tr> <tr> <td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td> </tr> </table> <table border="1" data-bbox="904 1061 1505 1145"> <tr> <td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td><td><math>\frac{1}{8}</math></td> </tr> </table>	1								$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	1								$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$4 \times \frac{1}{8}$ $\frac{1}{8} \times 4$ $\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} = 4 \times \frac{1}{8} = \frac{1}{8} \times 4$
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Small step	Concrete	Pictorial	Abstract
<p>Tenths/ hundredths/ thousandths</p>	<p>Using place value counters</p>  <p>Using dienes:</p> 	<p>Place value grid with circles</p>	<div style="border: 1px solid green; border-radius: 10px; padding: 10px; display: inline-block; margin-bottom: 10px;">0.394</div> <p>= 3 tenths, 9 hundredths and 4 thousandths</p> $= \frac{3}{10} + \frac{9}{100} + \frac{4}{1000}$ $= 0.3 + 0.09 + 0.004$
<p>Percentages</p>	<p>Use Dienes to represent percentages, e.g. 1 flat = 100% and so on.</p> 		

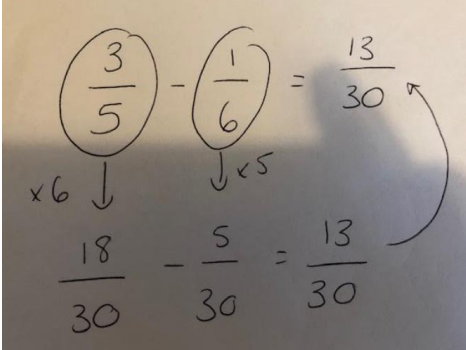
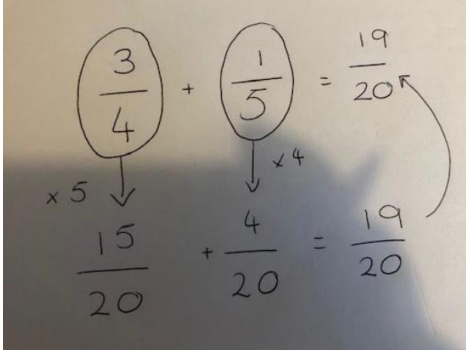
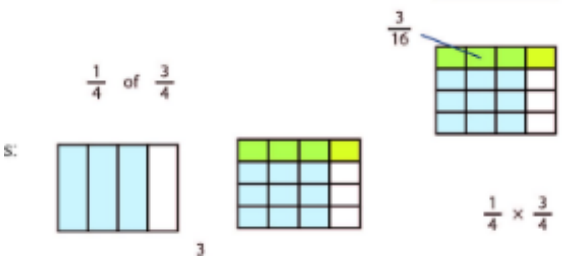
Small step	Concrete	Pictorial	Abstract
percentage and decimal equivalents of $1/2$ , $1/4$ , $1/5$ , $2/5$ , $4/5$ and those fractions with a denominator of a multiple of 10 or 25		<b>Numberline</b> 	e.g. $\frac{1}{2} = 0.5 = 50\%$ $\frac{1}{4} = 0.25 = 25\%$ $\frac{3}{4} = 0.75 = 75\%$ $\frac{1}{5} = 0.2 = 20\%$ $\frac{2}{5} = 0.4 = 40\%$ and so on ...

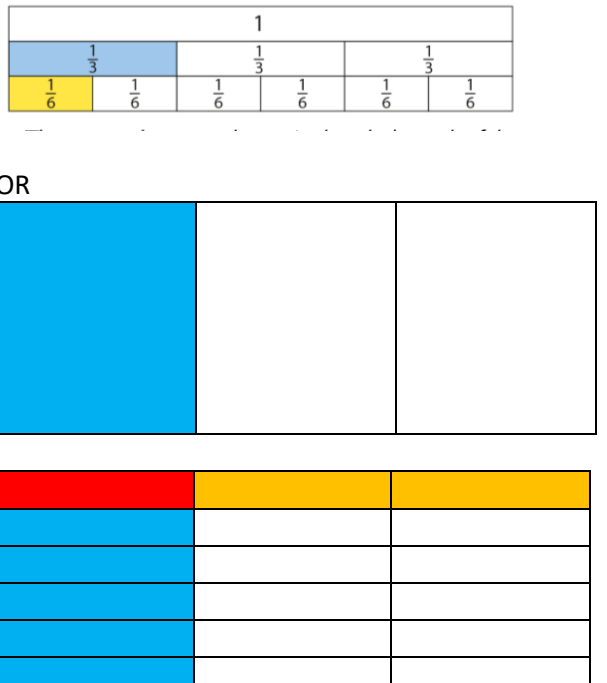
# YEAR 6

## National Curriculum Objectives

- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- compare and order fractions, including fractions  $> 1$
- add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- multiply simple pairs of proper fractions, writing the answer in its simplest form [for example,  $4 \frac{1}{2} \times 2 \frac{1}{2} = 8 \frac{1}{2}$ ]
- divide proper fractions by whole numbers [for example,  $\frac{1}{3} \div 2 = \frac{1}{6}$ ]
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example,  $\frac{3}{8}$ ]
- identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places
- multiply one-digit numbers with up to two decimal places by whole numbers
- use written division methods in cases where the answer has up to two decimal places
- solve problems which require answers to be rounded to specified degrees of accuracy
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.
- **RATIO OBJECTIVE:** solve problems involving the calculation of percentages [for example, of measures and such as 15% of 360] and the use of percentages for comparison

<b>Vocabulary</b> <i>(new vocabulary for year in bold/italic)</i>	<b>Stem Sentences</b> <i>(new stem sentence for year in bold/italic)</i>
one half, halves, one quarter, quarters, equal, two, four, parts, equal parts, divide into 2, split, share, whole, fraction numerator (tells you the 'number' of), denominator (nominates or names the fraction), three quarters, equivalent, balance, multiply, divide, division, multiplication fifths, tenths, unit-fraction, non-unit fraction hundredths, decimal, 'three point six', 'three point seven five) percent, percentage, mixed number, improper	The whole is split equally into _____ parts and _____ parts are shaded. Half of _____ is _____ Quarter of _____ is _____ If a quarter is _____ then the whole is _____ The numerator is _____ and the denominator is _____. _____ is equivalent to _____ If the _____ is the whole, the _____ is one part of the whole The value of the _____ is _____ tenths/hundredths.

Small step	Concrete	Pictorial	Abstract								
Add / subtract with different denominators			 								
Multiply pairs of proper fractions			<table border="0"> <tr> <td><math>\frac{1}{2} \times \frac{1}{4} = \frac{1}{8}</math></td> <td><math>\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}</math></td> </tr> <tr> <td><math>\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}</math></td> <td><math>\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}</math></td> </tr> <tr> <td><math>\frac{1}{2} \times \frac{1}{6} = \frac{1}{12}</math></td> <td><math>\frac{1}{6} \times \frac{1}{2} = \frac{1}{12}</math></td> </tr> <tr> <td><math>\frac{1}{3} \times \frac{1}{5} = \frac{1}{15}</math></td> <td><math>\frac{1}{5} \times \frac{1}{3} = \frac{1}{15}</math></td> </tr> </table>	$\frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$	$\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$	$\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$	$\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$	$\frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$	$\frac{1}{6} \times \frac{1}{2} = \frac{1}{12}$	$\frac{1}{3} \times \frac{1}{5} = \frac{1}{15}$	$\frac{1}{5} \times \frac{1}{3} = \frac{1}{15}$
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$\frac{1}{3} \times \frac{1}{5} = \frac{1}{15}$	$\frac{1}{5} \times \frac{1}{3} = \frac{1}{15}$										

Small step	Concrete	Pictorial	Abstract																														
Divide proper fractions by whole numbers			$\frac{1}{2} \div 3 = \frac{1}{6} \rightarrow \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$																														
Multiply and divide by powers of 10	Place Value Slider or use Place Value Grid with post-its	<table border="1" data-bbox="862 845 1467 1420"> <thead> <tr> <th>H</th> <th>T</th> <th>O ● t</th> <th>h</th> <th>th</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>1 ● 5 7 8</td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>5</td> <td>7 ● 8</td> <td></td> <td></td> </tr> <tr> <th>H</th> <th>T</th> <th>O ● t</th> <th>h</th> <th>th</th> </tr> <tr> <td></td> <td>4</td> <td>0 ● 0 2</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>4 ● 0 0 2</td> <td></td> <td></td> </tr> </tbody> </table>	H	T	O ● t	h	th			1 ● 5 7 8			1	5	7 ● 8			H	T	O ● t	h	th		4	0 ● 0 2					4 ● 0 0 2			$1.578 \times 100 = 157.8$ $40.02 \div 10 = 4.002$
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Small step	Concrete	Pictorial	Abstract																																															
Percentages of amounts		<p>Bar model</p> <table border="1" data-bbox="855 209 1480 338"> <tr> <td colspan="10" style="text-align: center;">400</td> </tr> <tr> <td style="background-color: yellow;">40</td> <td style="background-color: yellow;">40</td> <td style="background-color: yellow;">40</td> <td>40</td> <td>40</td> <td>40</td> <td>40</td> <td>40</td> <td>40</td> <td>40</td> <td>40</td> </tr> </table> <p>30% of 400 = 40 + 40 + 40 = 120</p>	400										40	40	40	40	40	40	40	40	40	40	40	<p><u><math>30\% \text{ of } 400 = 120</math></u>  <math>10\% \text{ of } 400 = 40</math>  <math>30\% = 3 \times 40 = 120</math></p> <p><b>NCETM:</b></p> <ul style="list-style-type: none"> <li>• 40% of 15</li> <li>• 25% of 680</li> </ul> <table border="1" data-bbox="1518 459 1704 643"> <tr><td><b>100%</b></td><td><b>15</b></td></tr> <tr><td>10%</td><td></td></tr> <tr><td>40%</td><td></td></tr> </table> <table border="1" data-bbox="1783 459 1968 643"> <tr><td><b>100%</b></td><td><b>680</b></td></tr> <tr><td>50%</td><td></td></tr> <tr><td>25%</td><td></td></tr> </table> <ul style="list-style-type: none"> <li>• 5% of 1,400</li> <li>• 75% of 240</li> </ul> <table border="1" data-bbox="1518 743 1704 927"> <tr><td><b>100%</b></td><td><b>1,400</b></td></tr> <tr><td>10%</td><td></td></tr> <tr><td>5%</td><td></td></tr> </table> <table border="1" data-bbox="1783 743 1968 991"> <tr><td><b>100%</b></td><td><b>240</b></td></tr> <tr><td>50%</td><td></td></tr> <tr><td>25%</td><td></td></tr> <tr><td>75%</td><td></td></tr> </table>	<b>100%</b>	<b>15</b>	10%		40%		<b>100%</b>	<b>680</b>	50%		25%		<b>100%</b>	<b>1,400</b>	10%		5%		<b>100%</b>	<b>240</b>	50%		25%		75%	
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