Maths Progression Document Fractions including Decimals and Percentages Year 5 and 6

	Reception Vocabulary Whole, parts of a whole, half, quarter ***Year 1 Vocabulary*** Fraction, equal part, equal grouping, equal sharing, one of two equal parts, one of four equal parts ***Year 2 Vocabulary*** equivalent fraction, numerator, denominator two halves, two quarters, three quarters, one third, two thirds, one of three equal parts ***Year 3 Vocabulary*** mixed number, unit, non-unit fractions, improper fraction sixths, sevenths, eighths, tenths ***Year 4 Vocabulary*** Hundredths, mixed number, proper/improper fractions decimal, decimal fraction, decimal point, decimal place, decimal equivalent proportion	
Key Vocabulary	***Year 5 Vocabulary*** (re-visit proper/improper and mixed number fraction) equivalent, reduced to, cancel, thousandths, in every, for every percentage, per cent, %	***Year 6 Vocabulary*** ratio
Year group	***Year 5***	***Year 6***
Key skills	• *Compare and order fractions whose denominators are 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* • *Add and subtract fractions with the same denominator and denominators that are multiples of the same number.*	• *Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.* • *Compare and order fractions including fractions >1* • *Generate and describe linear number sequences (with fractions).* • *Add and subtract fraction with different denominations and mixed numbers, using the concept of equivalent fractions* • *Multiply simple pairs of proper fractions, writing the answer in its simplest form.* • *Divide proper fractions by whole numbers*

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	• *Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.* • *Read and write decimal numbers as fractions.* • *Find the effect of dividing a one or two digit number by 10 or 100, identifying the value of the digits in the answer as ones, tenths and hundredths* • *Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.* • *Solve simple measure and money problems involving fractions and decimals to two decimal places.* • *Read, write, order and compare numbers with up to three decimal places.* • *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.* • *Solve problems involving number up to three decimal places.* • *Recognise and write decimal equivalents of any number of tenths or hundredths.* • *Recognise the percent 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 2.*	• *Associate a fraction with division and calculate decimal fraction equivalents for a fraction.* • *Recall and use equivalences between simple fractions, decimals and percentages.* • *Identify the value of each digit in numbers given to 3 decimal places and multiply numbers by 10, 100 and 1,000 giving answers up to 3 decimal places.* • *Multiply 1-digit numbers with up to 2 decimal places by whole numbers.* • *Use written division methods in cases where the answer has up to 2 decimal places.* • *Solve problems which require answers to be rounded to specified degrees of accuracy.* • *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 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.*

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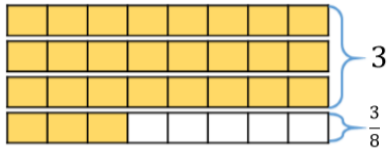
What it looks like in models and images. Note – this is not exhaustive, guidance should be taken from our calculation policy as well as WR Maths small steps guidance.

Use of models and images for mixed numbers and improper fractions.

$\frac{27}{8}$  $3\frac{3}{8}$

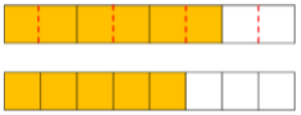
Move towards the abstract method of multiplying and dividing:

$\frac{27}{8}$ = 27 ÷ 8 = 3 r 3 = $3\frac{3}{8}$

$3\frac{3}{8}$ = 3 x 8 + 3 = $\frac{27}{8}$

Use of models and images for comparing and ordering fractions with multiples of the same number.

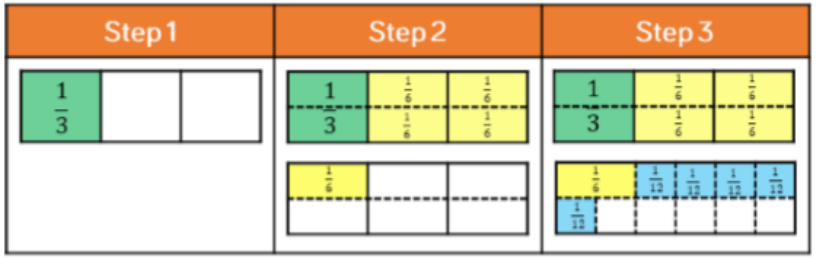
Use bar models to compare $\frac{5}{8}$ and $\frac{3}{4}$



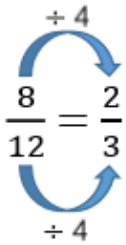
Abstract method: finding a common denominator (in this case 8) and using the method of equivalent fractions.

$\frac{3}{4} = \frac{6}{8}$ *because 4 x 2 = 8 so repeated with the numerator, 3 x 2 = 6*

Use of models and images for adding and subtracting fractions with different denominators.



Use of factors to simplify fractions.



Use of models and images for comparing and ordering fractions with different denominators.

$\frac{3}{4}$ and $\frac{2}{3}$ 

Abstract method:

Dora is comparing $\frac{5}{6}$ and $\frac{3}{4}$ by finding the lowest common multiple of the denominators.

Multiples of 6: 6, 12, 18, 24

Multiples of 4: 4, 8, 12, 16,

12 is the LCM of 4 and 6

$\frac{5}{6} = \frac{10}{12}$ $\frac{3}{4} = \frac{9}{12}$

$\frac{10}{12} > \frac{9}{12}$

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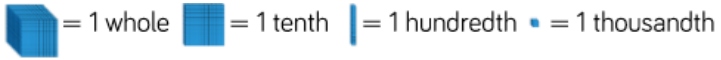
Abstract method: find a common denominator and change the fractions accordingly using the abstract method explained above.

Use of models and images for multiplying fractions by whole numbers.

$\frac{1}{6} \times 4$

Abstract method: denominator stays the same and you multiply the numerator by the whole number. If the answer is an improper fraction then use the method shown above to convert it to a mixed number.

Use base ten as the whole when exploring thousandths and use place value counters.



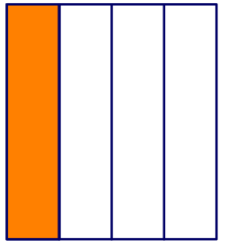
Use various ways to represent decimal numbers.

Concrete	Decimal	Decimal – expanded form	Fraction	Fraction – expanded form	In words
	3.24	3 + 0.2 + 0.04	$3\frac{24}{100}$	$3+\frac{2}{10}+\frac{4}{100}$	Three ones, two tenths and four hundredths.
	3.01		$3\frac{1}{100}$		
				$3+\frac{4}{10}+\frac{2}{100}$	
					Two ones, three tenths and two hundredths.

Use of place value counters and number lines to round decimals.

Use of models and images for multiplying pairs of fractions.

What is $\frac{1}{3} \times \frac{1}{4}$?



This is $\frac{1}{4}$ of a rectangle.

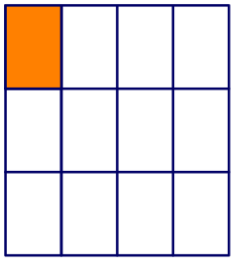
What does $\frac{1}{3} \times \frac{1}{4}$ mean?

Remember $\frac{1}{3} \times \frac{1}{4}$ means:

$\frac{1}{3}$ lots of $\frac{1}{4}$

or $\frac{1}{3}$ of $\frac{1}{4}$

What is $\frac{1}{3} \times \frac{1}{4}$?



This is $\frac{1}{3}$ of our $\frac{1}{4}$ of a rectangle.

What fraction are we left with?

It is $\frac{1}{12}$ of the total rectangle.

Abstract method:

$$\frac{1}{3} \times \frac{1}{4} = \frac{1 \times 1}{3 \times 4}$$

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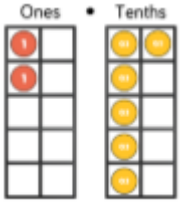
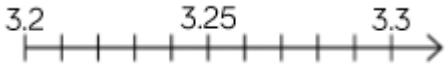
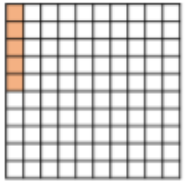
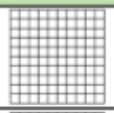
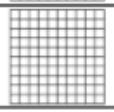
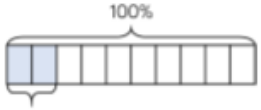




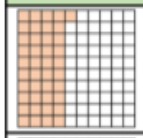
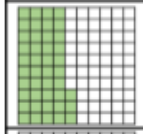
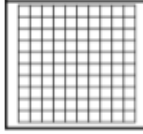
Use of models and images to understand percentages and write them as fractions and percentages.



Pictorial	Parts per hundred	Percentage
	There are 51 parts per hundred.	
		75%



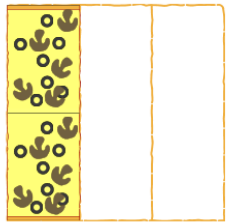
Use of pictorial with abstract.

Pictorial	Percentage	Fraction	Decimal
	41 parts per hundred 41%	41 out of 100 $\frac{41}{100}$	41 hundredths 0.41
			
	7 parts per hundred 7%		

Use of models and images for dividing proper fractions by whole numbers.

What is $\frac{1}{3} \div 2$?

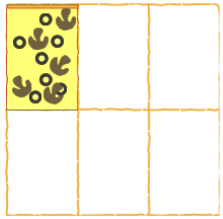
This is $\frac{1}{3}$ of a pizza.



What does $\frac{1}{3} \div 2$ mean?

It means divide the $\frac{1}{3}$ into 2 equal pieces.

This is $\frac{1}{3} \div 2$



What fraction is this part?

It is $\mathbf{\frac{1}{6}}$ of the whole pizza.

Abstract method:

$$\frac{1}{3} \div 2 = \frac{1}{2} \text{ of } \frac{1}{3} = \frac{1}{2} \times \frac{1}{3} = \frac{1 \times 1}{2 \times 3} = \mathbf{\frac{1}{6}}$$

Use of place value counters to multiply a number with up to 3 decimal plaes by a whole number.

1.212 by 3

Tens	Ones	Tenths	Hundredths	Thousandths
				
				
				

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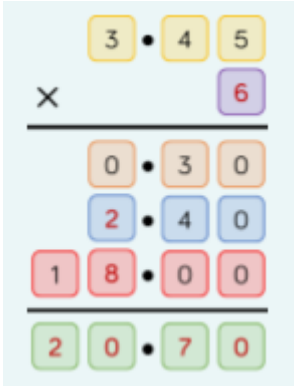
		Abstract method:  *Use of place value counters to divide a number with up to 3 decimal places by a whole number.* 3.69 by 3  *Abstract method:* 

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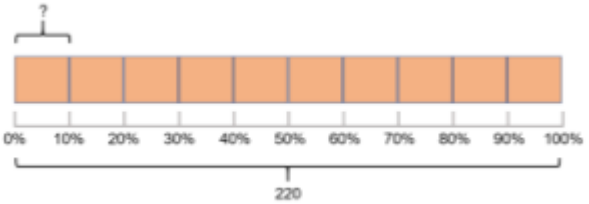
Abstract method of fractions, decimals and percentage equivalents.

Decimal	Fraction	Percentage
0.35	$\frac{35}{100}$	35%
0.27		
0.6		
0.06		

Use of a bar model to find percentages of amounts alongside the method.

30% of 220



Abstract method:

10% of 220 = 22 , so 30% of 220 = 3 × 22 = 66