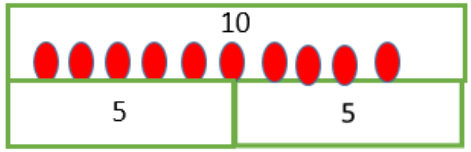
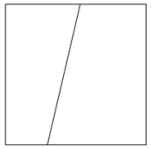
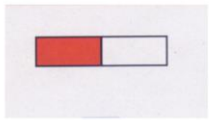
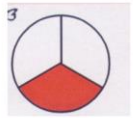
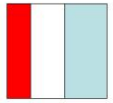
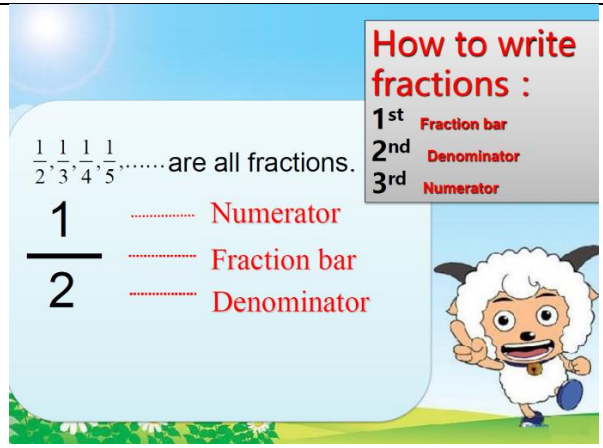
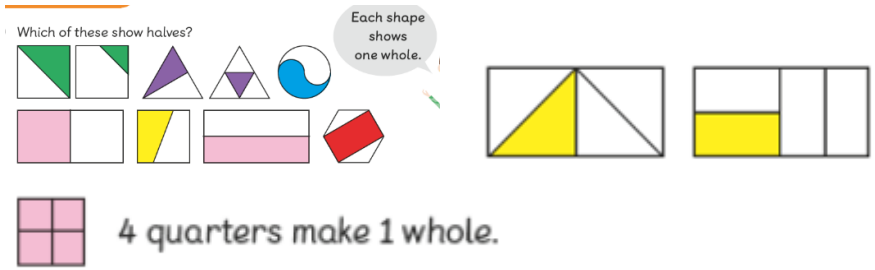
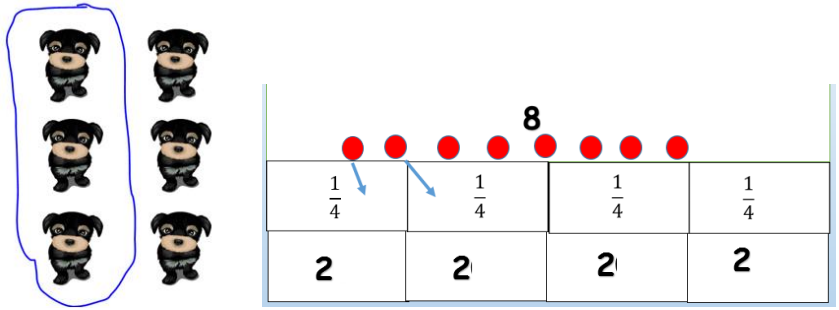
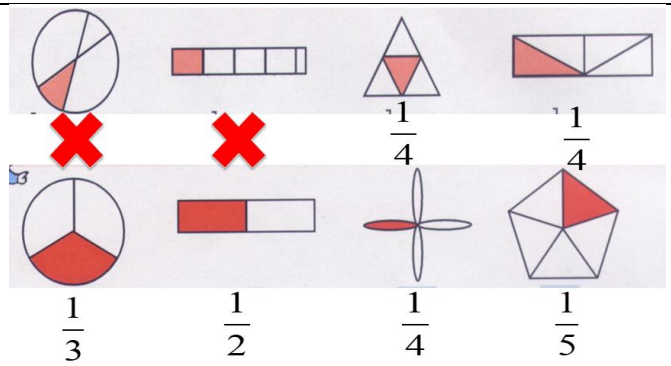
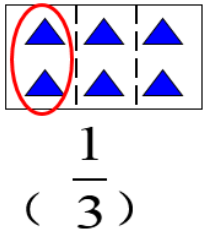
DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

Year	Objectives	Examples	Models and Images
Reception	They solve problems involving problems, including doubling, halving and sharing.	Division can be introduced through halving. Children begin with mostly pictorial representations linked to real life contexts. Although not explicit in the development matters document, the sharing model is a useful way of introducing young children to fractions and calculating with fractions. I have 10 sweets. I want to share them with my friend. How many will we have each?	**Linked into multiplication and division** Use bar model to show representation and model using sharing. 
Year 1	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	To understand the whole and part relationship using context, shapes and quantity. **The relationship between a whole and the parts.** **A whole can be divided into many parts.** **Many parts can make one whole.** Divide the whole into several equal - parts-------- Divide equally.	 **(6)** **Say: If …….. is the whole, then ……. is the part of the whole.**    **(1)** **(2)** **(3)** **Say: If …….. is the whole, then ……. is the part of the whole.**

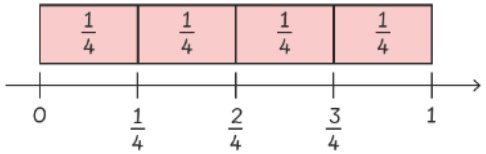
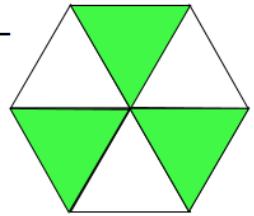
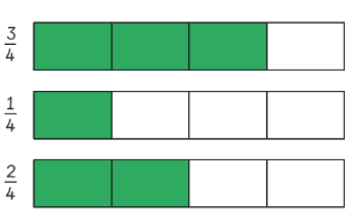
DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

		Children to write the fraction properly. **Start with the fraction line, then the denominator (number of parts the whole is divided equally), then the numerator (the number of parts circled or shaded).**	
		Children recognise ½ and ¼. They can find these fractions of a shape, object or number. Use the language of unit fractions when the numerator is one.	
		Children use their knowledge of fractions of shape to find fractions of quantities. Children should be give practical apparatus to find halves and quarters of quantities within 20.	

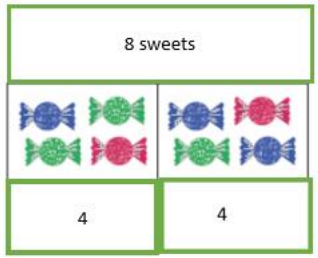
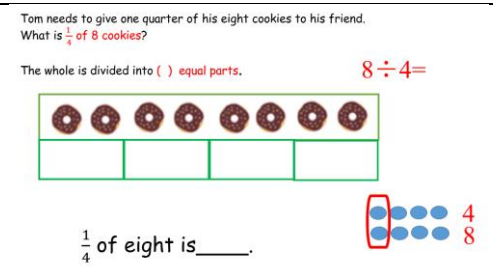
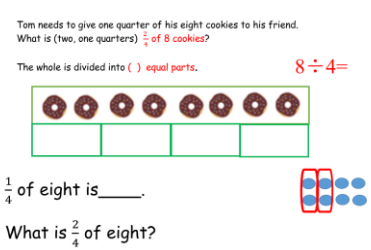
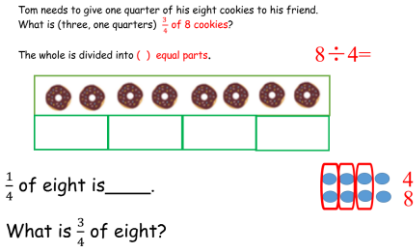
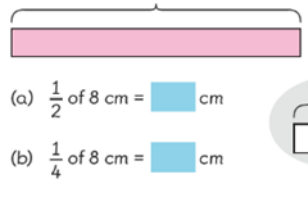
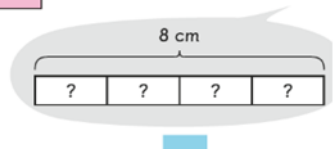
DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

		Finding fractions of a number is linked to strategies used when sharing and grouping in division. Use the bar model that's shows concrete, pictorial abstract. Children use concrete objects and pictures to answer questions such as: What is ½ of 12?	Children to record work pictorially.
Year 2	Recognise, find, name and write fractions $\frac{1}{3}, \frac{1}{4}, \frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity.	**Refer to previous years methods – this is essential!** Children use their knowledge of unit and non-unit fractions of shapes to find fractions of quantities. **Unit fractions** $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \ldots\ldots$ Numerator--- "1" One part of the whole. Denominator--- How many equal parts. Non-unit fractions $\frac{4}{9}$ $\frac{9}{10}$ $\frac{5}{7}$ Numerator: Several equal parts (coloured or circled). Denominator: How many equal parts of the whole. KEY LANGUAGE FOR NON-UNIT FRACTIONS:	 

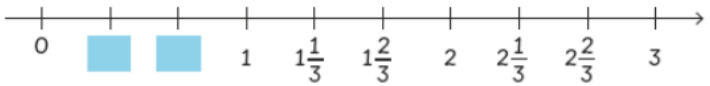
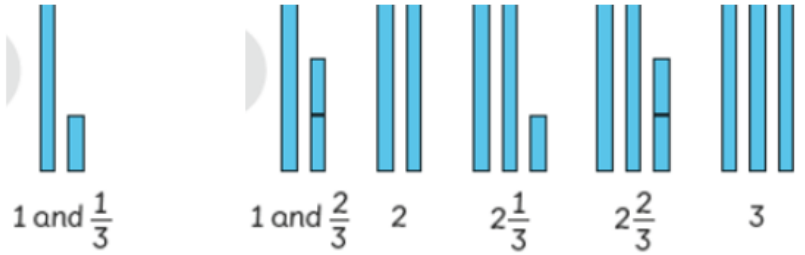
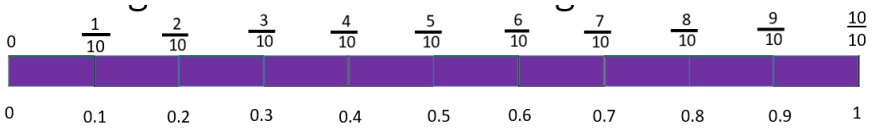
DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

	Write simple fractions e.g. $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$.	$\frac{3}{4}$ SHOULD BE READ AS THREE, ONE QUARTERS, OR 3 LOTS OF ONE QUARTER. EG three, $\frac{1}{4}$ Three lots of $\frac{1}{4}$. This support the understanding of repeated addition $\frac{1}{4}+\frac{1}{4}+\frac{1}{4}$ Use bar models to show different fractions. $\frac{4}{4}$ is equal to one whole. Comparing fractions: $\frac{3}{4} > \frac{1}{4}$ Because $\frac{3}{4}$ is three, one quarters. Place these on a numberline and encourage children to understand that fractions are numbers in their own right.  Use Cuisenaire rods so children can explore practically.	**The hexagon is divided into _____ equal parts.** **Each part is _____ of the hexagon.**  **$\frac{3}{6}$ is 3 one sixth $\frac{1}{6}$** **$\frac{3}{6}$** What does the 6 represent? What does the 3 represent? **The green parts are (_) ( ) of the hexagon.** This stands for 1. Which of these shows $\frac{3}{4}$? 

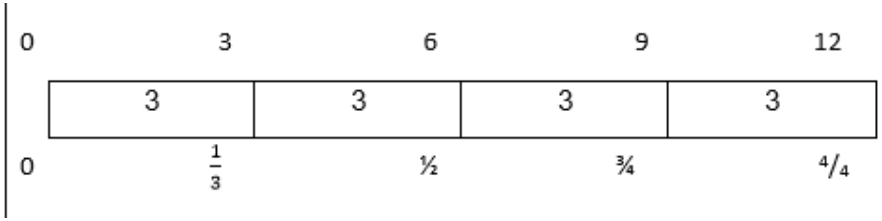
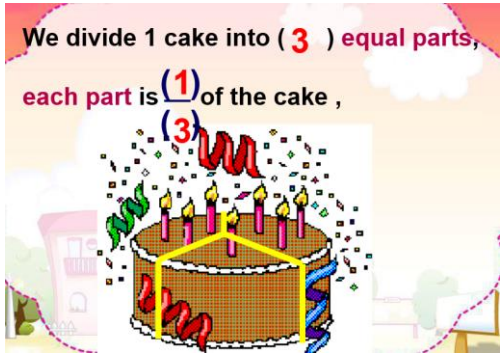
DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

		What is half of 8 sweets? Relate the idea of finding $\frac{1}{2}$ of an amount to 'dividing by 2'. Use the bar model to show how to divide the whole equally b 2. Use understanding of multiplication and arrays to find fractions of amounts. What is $\frac{1}{4}$ of 12? What is $\frac{2}{4}$ of 12? What is $\frac{3}{4}$ of 12? They relate this to find fractions of a length e.g. $\frac{2}{4}$ of 1m = Children need to relate finding a quarter to halving and halving again. *Pupils should count in fractions up to 10, starting from any number and using the1/2 and 2/4 equivalence on the number line (Non Statutory Guidance)*	     

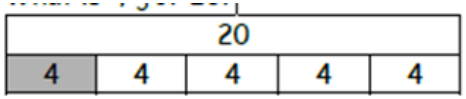
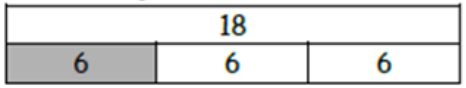
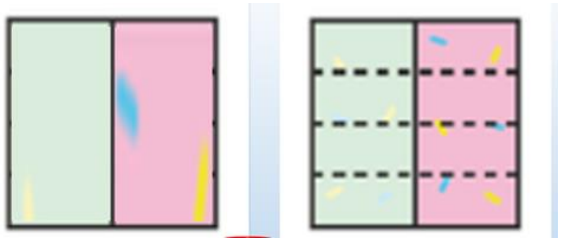
DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

		 One third, two one thirds, three one thirds = one whole, one whole and one third etc.  Use a number line to show children where the fractions will go.	
Year 3	Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts; and from dividing one-digit numbers or quantities by 10.	**Refer to previous years methods – this is essential!** Count forwards and backwards in tenths (1⁄10 and 0·1) between 0 and 1 using apparatus, e.g., counting sticks, number lines or number hoops. $1 \div 10 = \frac{1}{10}$ $2 \div 10 = \frac{2}{10}$ $3 \div 10 = \frac{3}{10}$ Continue the pattern. What do you notice? What's the same? What's different? 10 equal parts is the same value as one whole. The whole is divided equally into ten equal parts. So, what can we say about each part? **Each part is 0.1**	**Each part is 0.1** **I say it as zero point one but I know it means one tenth.** 

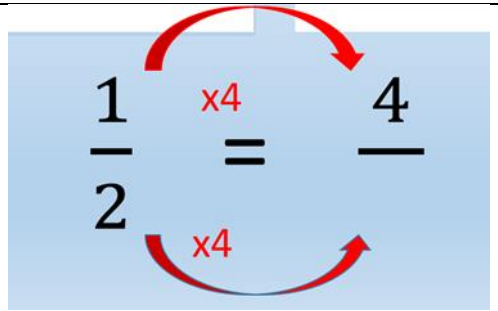
DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

		I say it as zero point one but I know it means one tenth. **What does the 0.2 represent?** **I say it as zero point two but I know it means two tenths because it's 0.1 (or one-tenth) times two.** **0.2 represent one tenth times 2.** **0.1 x 2= 0.2** Understand that a decimal point is used to separate whole amounts and parts of the whole when writing decimal numbers.	
	recognise, find and write fractions of a discrete set of objects: recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators	Children can use fractions as an operator E.g. $\frac{1}{4}$ of 12 = 12 ÷ 4 = 3 Children can relate fractions to the division of integers $1 \div 4 = \frac{1}{4}$ $4 \times \frac{1}{4} = 1$ $3 \div 4 = \frac{3}{4}$	 

DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

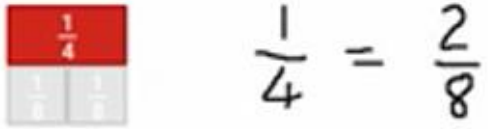
		$\frac{3}{4}$x 4 = 3 (12/4 or ¾ + ¾ + ¾ + ¾)	We divide one apple into 2 equal parts, each part is $\frac{1}{2}$ of the apple.
		Children will continue to find and write fractions of a quantity or number of objects. These will be linked to their known multiplication and division facts e.g. What is $\frac{1}{5}$ of 20? Count in groups of 5 to find how many in each group. Use the bar model as a representations. 20 ÷ 50 = 4 ? x 5 = 20	 What is $^1/_3$ of 18? 
	recognise and show, using diagrams, equivalent fractions with small denominator	Children to understand that equivalent fractions are two or more fractions that have the same value. Record method as follows.	

DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES



Their numerator and denominator are different, but they are equivalent fractions.

Use Cuisenaire rods to develop vocabulary of equivalence.

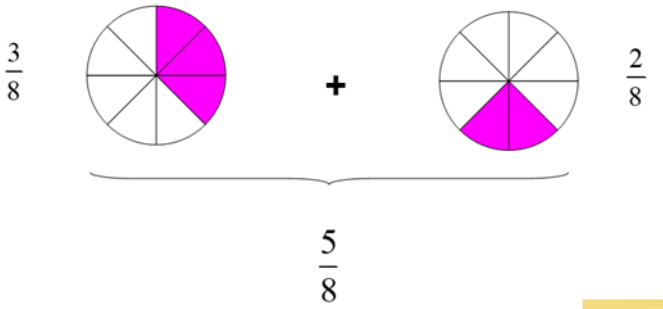


add and subtract fractions with the same denominator within one whole

When adding fractions with the same denominator, this method will support children to understand they only add the numerators.

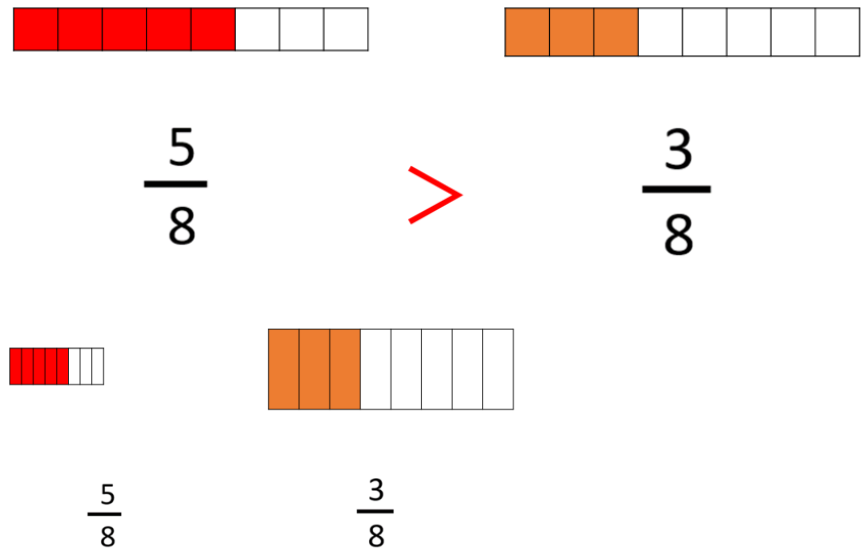
Keep the denominator the same and add the numerators.

$$\frac{3}{8} + \frac{2}{8} = \frac{2+3}{8} = \frac{5}{8}$$

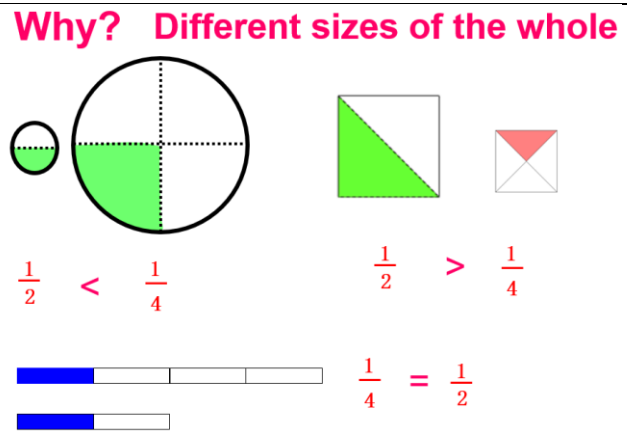
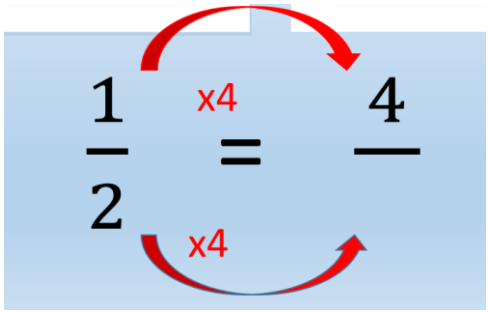
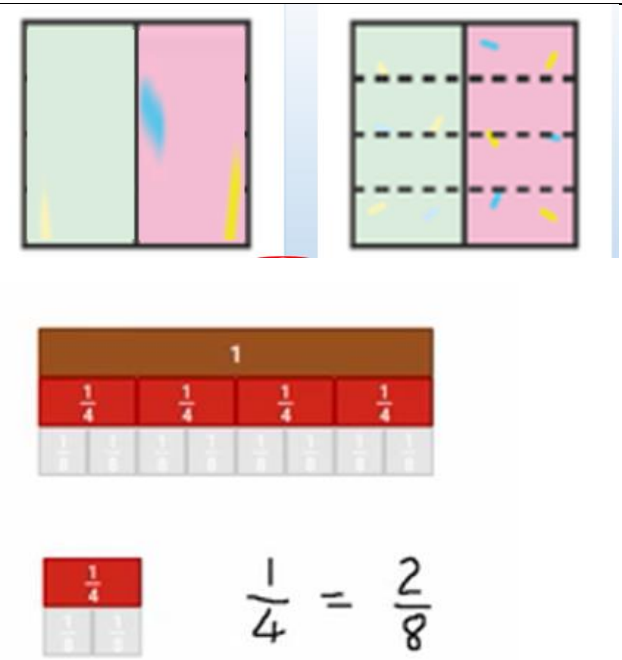


Encourage chidlren to use bar models as their representations.

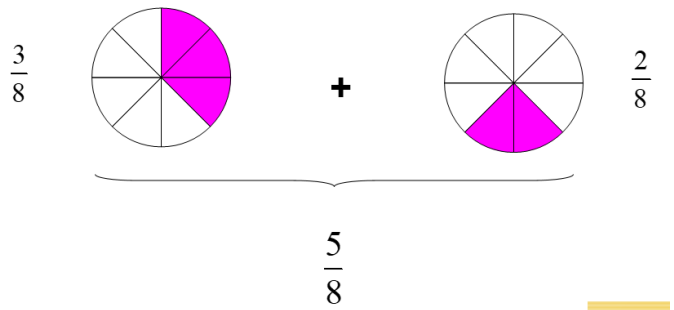
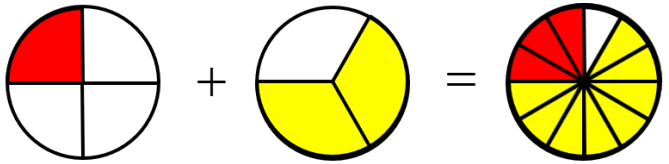
DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

	compare and order unit fractions, and fractions with the same denominators	$\frac{3}{8}$ Is 3 (one eighths) $\frac{1}{8}$ $\frac{5}{8}$ is..... Five $\frac{1}{8}$ (one eighths). 'because three < five. So $\frac{3}{8} < \frac{5}{8}$	 Draw attention to the size of the whole.

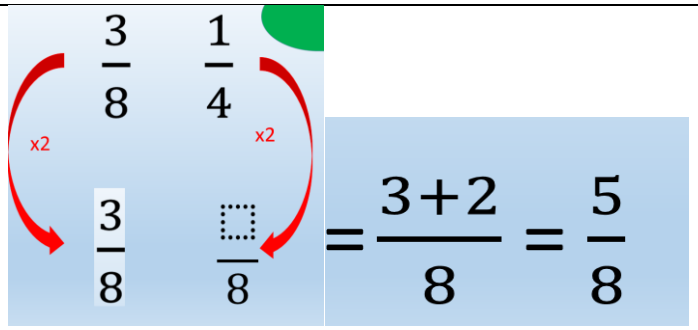
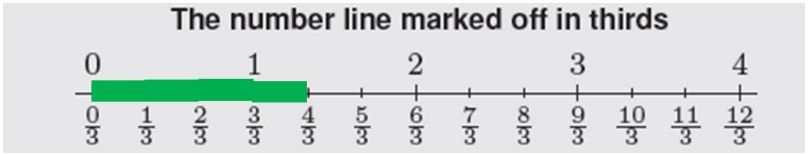
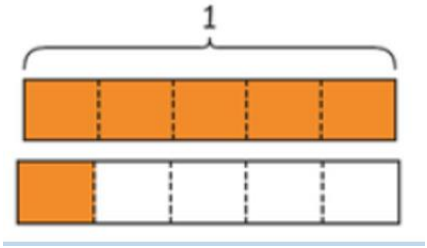
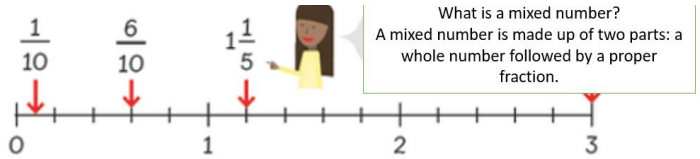
DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

			
Year 4	Children can recognise and show the equivalence of any fraction.	**Refer to previous years methods – this is essential!** Children to understand that equivalent fractions are two or more fractions that have the same value. Record method as follows.  **Their numerator and denominator are different, but they are equivalent fractions.** **Use Cuisenaire rods to develop vocabulary of equivalence.**	

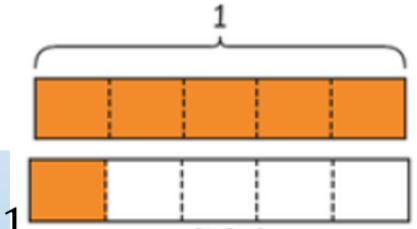
DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

	Add and subtract fractions with the same denominator within one whole	When adding fractions with the same denominator, this method will support children to understand they only addd the numerators. Keep the denominator the same and add the numerators. $\frac{3}{8} + \frac{2}{8} = \frac{2+3}{8} = \frac{5}{8}$	
Year 5	Add and subtract fractions with the same denominator and denominators that are multiples of the same number.	**Refer to previous years methods – this is essential!** The addition and subtraction of fractions with different denominators, do reduction first and then calculate by the method of fractions with the same denominator. **Different denominators** → **Same denominators** Model method below ensuring children are making links between the denominator and the multiplication.	$\frac{1}{4} + \frac{2}{3} =$  $\frac{3}{12} + \frac{8}{12}$

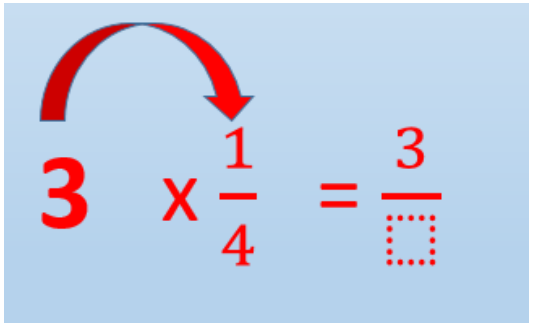
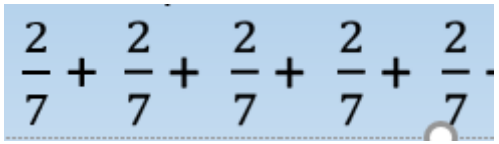
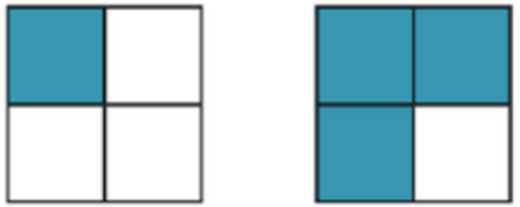
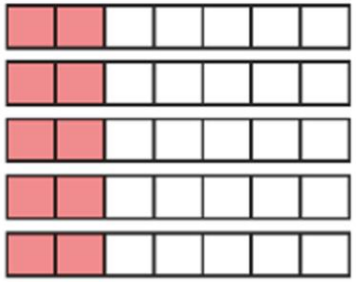
DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

	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 = 11/5].	 Improper fractions. Know that when the numerator is larger than the denominator it is an improper fraction. Show children improper fractions and mixed numbers on a numberline. Eg if we look at $\frac{4}{3}$. How many thirds altogether? How could we work this out without counting all the thirds? For this example, the denominator is 3. This means we are using our multiples of 3. We divide the numerator by the denominator but to do this we use our understanding of multiplication. Record method like below: To find a mixed number, you divide the numerator by the denominator. The number of equal groups of the denominator gives you're the whole number.	  

DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

		$\div \frac{6}{5} = 1\frac{1}{5}$ How many groups of five can I make with 6? Use bar models to support children's understanding. Write a mixed number as an improper fraction, e.g., $1\frac{1}{5}$ = six fifths = $\frac{6}{5}$. $1\frac{1}{5} = \frac{6}{5}$ You need to multiply the mixed number by the denominator this gives your 5 fifths. Then add the one fifth. This means you multiply the mixed number by the denominator and then add the numerator. $1\frac{1}{5} = \frac{\square}{5}$ You need to ask children, how many _____makes the whole?	$1 = \frac{5}{5}$  $\frac{1}{5}$ = one fifth

DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

	Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.	Mutlipying fractions by whole numbers. 3 x$\frac{1}{4}$. This means one quarter, three times or three lots of one quarter.  Multiply the fraction's numerator by the whole number. Simply, if needed. Convert to a mixed number, if needed. Look at it as repeated addition too:  	 This shows $\frac{2}{7}$. Find the value of $5 \times \frac{2}{7}$. 

DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

$$3 \times \frac{2}{5} = \frac{6}{5} = 1\frac{1}{5}$$

Multiply mixed numbers by whole numbers by:

partitioning, e.g., $3\frac{2}{3} \times 4 = (3 \times 4)$ and $4 \times 2/3 + 2/3 + 2/3 + 2/3$;

3 x 2 and $\frac{2}{5}$

Model both methods:

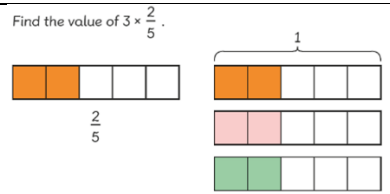
Convert mixed number into an improper fraction:

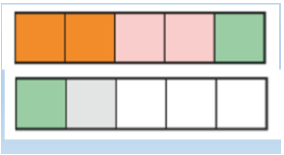
3 x 2 and $\frac{2}{5}$ = 3 x $\frac{12}{5}$ = twelve fifths multiplied by 3 = $\frac{36}{5}$. Then turn back to a mixed number.

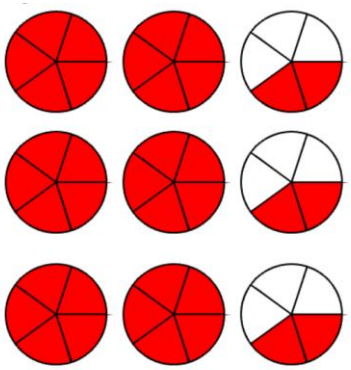
Or we could partition the mixed number into 2 and $\frac{1}{2}$

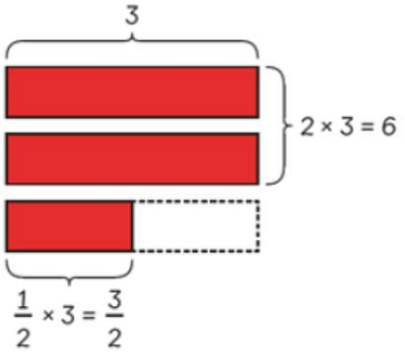
$$2\frac{1}{2} \times 3 = 6 + \frac{3}{2}$$
$$= 6 + 1\frac{1}{2}$$
$$= 7\frac{1}{2}$$

Encourage children to notice what's the same? What's difference?

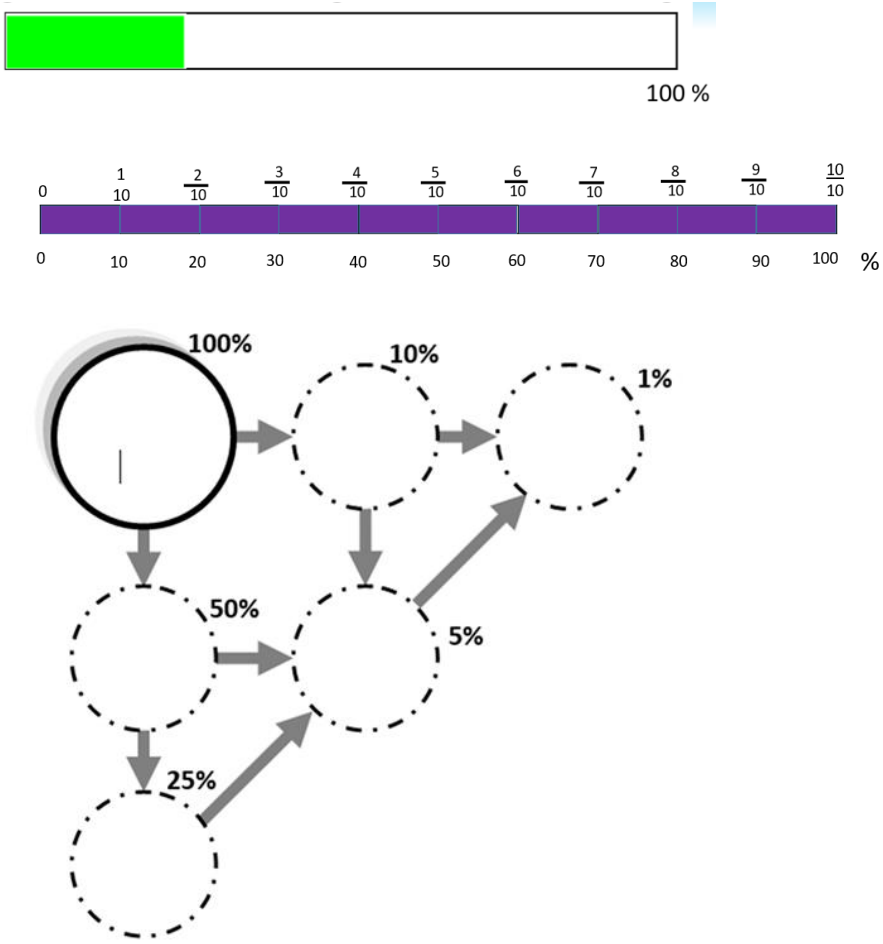




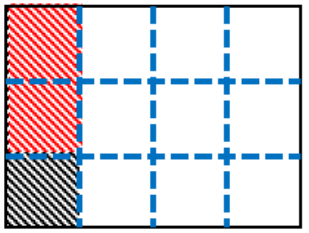
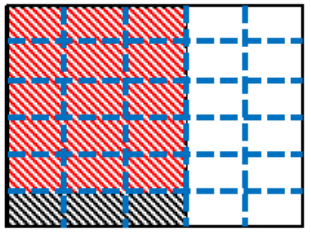
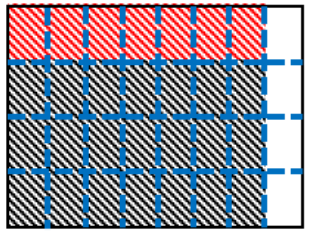




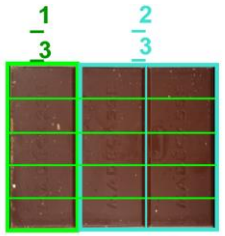
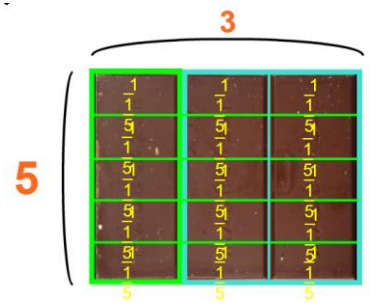
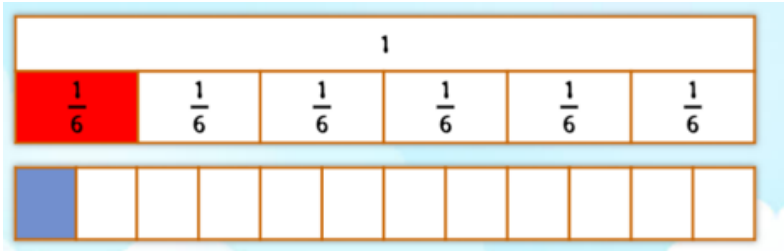
DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

	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.	Finding percentages- use the bar model and the percentage bubble to see connections and relationships with different percentages. Link the bar model to the percentage bubble. Focus on half, then half again and the relationships between 50%, 25% and 75%. The whole is divided equally into ten equal parts. So, what can we say about each part? Each part is 10% I say it as ten percent because I know it means one tenth of the whole. Method needs to be recorded alongside, eg: Find 10 % of 230 230 ÷ 10 = 23 10% 0f 230 = 23 Find 12% of 230. Find 10 % first, then find 1%.	

DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

Year 6	multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$	**Refer to previous years methods – this is essential!** $\frac{1}{4} \times \frac{2}{3} = \frac{1 \times 2}{4 \times 3} = \frac{2}{12}$ $\frac{3}{5} \times \frac{5}{6} = \frac{3 \times 5}{5 \times 6} = \frac{15}{30}$ $\frac{7}{8} \times \frac{1}{4} = \frac{7 \times 1}{8 \times 4} = \frac{7}{32}$ Multiply the numerators, multiply the denominators !	  

DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES

	Divide proper fractions by whole numbers (e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$)	$\frac{1}{3} \div 5$ One third divided by 5. $\frac{1}{4} \div 6 = \frac{1}{6 \times 4} = \frac{1}{24}$ *When **dividing a fraction by whole number**, we **multiply the denominator by the whole number.*** **Encourage children to use the bar model to represent how to divide fractions.** $\frac{1}{6} \div 2 = \frac{\square}{\square \times \square} = \frac{\square}{\square}$	 We ***can*** divide the third into five equal sections But we must think of **the third as a part of the whole bar**.  $\frac{1}{3} \div 5 = \frac{1}{3 \quad x \quad 5} = \frac{1}{15}$ 

DEVELOPING UNDERSTANDING OF FRACTIONS/DECIMALS AND PERCENTAGES