Carterhatch Junior School

Calculation Policy

2022 - 2023

Presentation -

Expectation of layout for the four operations.

Addition	*Subtraction*	*Multiplication*	*Division*
36 +25 61 1	2 1 2~~3~~4 - 88 6	1 2 4 × 2 6 7 4 4 1 2 2 4 8 0 3 2 2 4 1 1 Answer: 3224	123 5 ⟌ 615 1 1 Example of long division on page 17.
- Ensure digits are aligned properly (use PV if needed – usually with decimal numbers). - Method is shown on the left-hand side. - Digits are carried below the line not on top. - Two lines are drawn for the answer. - Carried digits are smaller.	- Ensure digits are aligned properly (use PV if needed – usually with decimal numbers). - Method is shown on the left-hand side. - Digits are exchanged on top. - Two lines are drawn for the answer. - Exchanged digits are smaller.	- Ensure digits are aligned properly (use PV if needed – usually with decimal numbers). - Method is shown on the left-hand side. - Digits are carried below the line not on top. - Two lines are drawn for the answer. - Carried digits are smaller.	- Short division. - Divisor on the outside. - Dividend (number being divided) on the inside. - Remainders carried above the original digits. - Remainders smaller than the other digits.

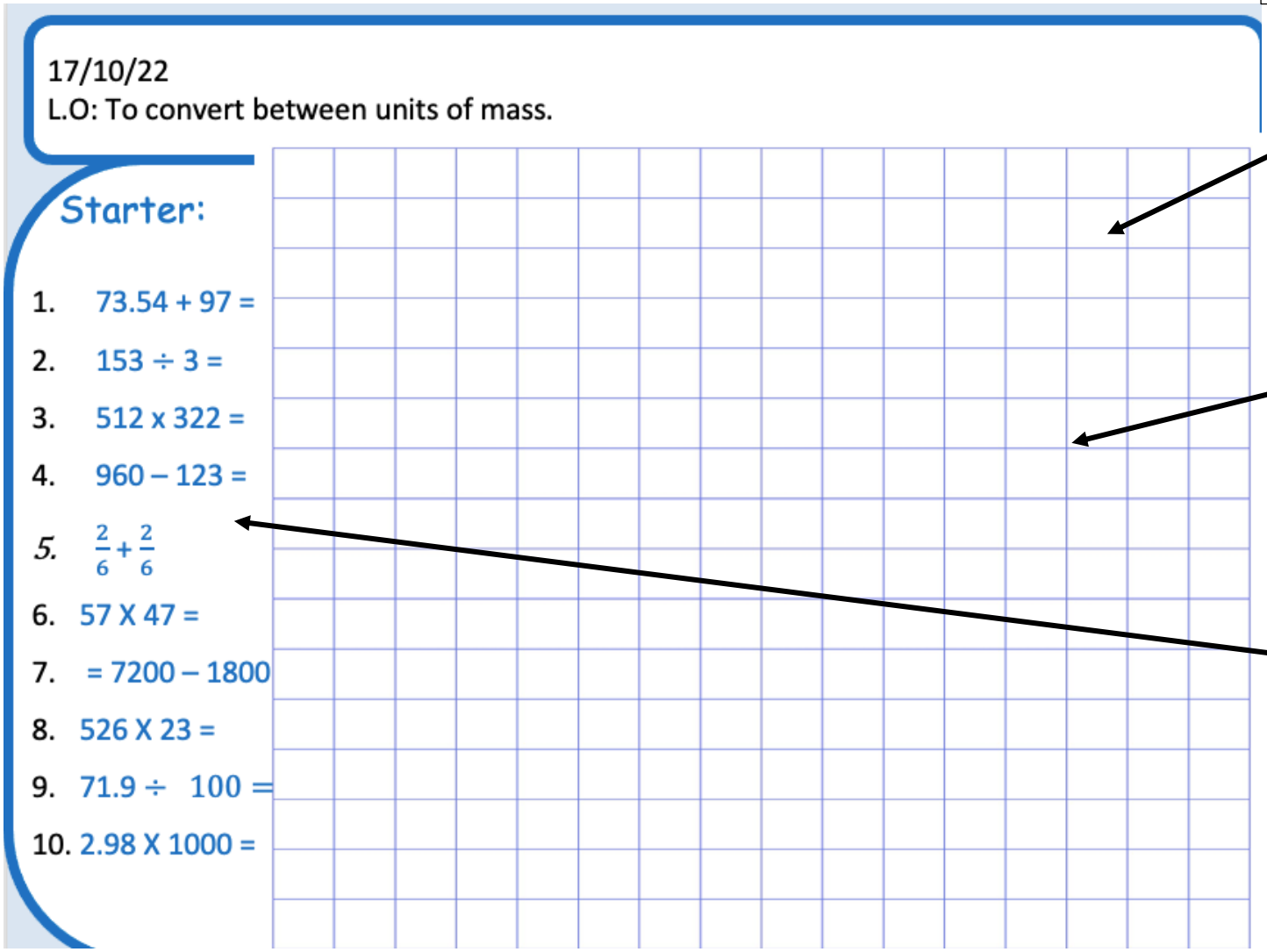
Starters -

Daily mixed arithmetic

Expectation of 5 mixed arithmetic questions in years 3-5.

10 questions for year 6.

Year 6 example shown below.



Enough space to show full calculations and misconceptions for each question.

Grid to replicate expected presentation in pupil's book.

Variety of arithmetic questions

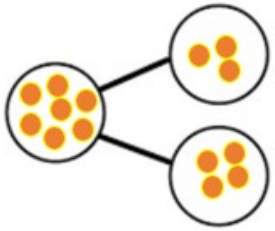
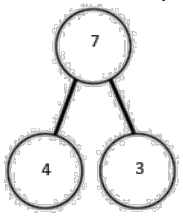
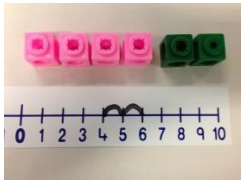
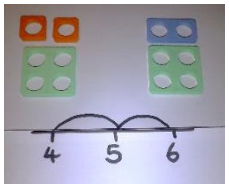
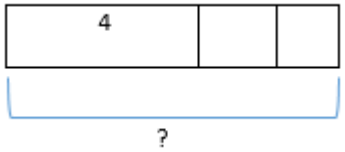
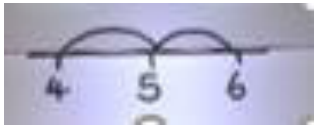
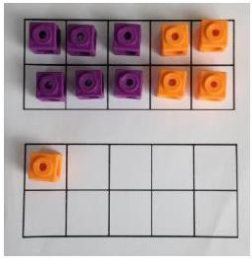
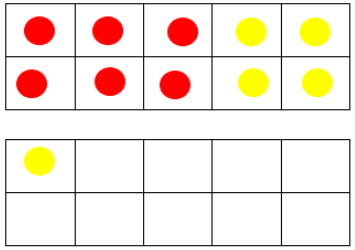
- Questions must link to what has been taught.
- To provide secure knowledge on skills they should ALREADY have.
- Can be taken from test papers.
- Mixture of skills to be used.

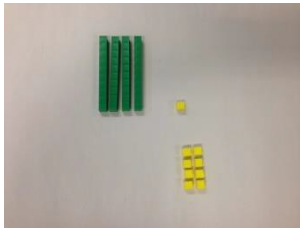
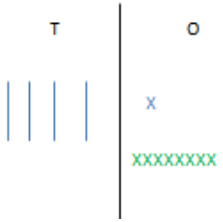
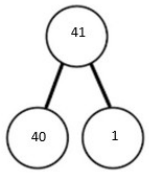
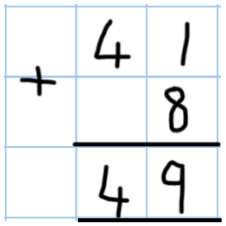
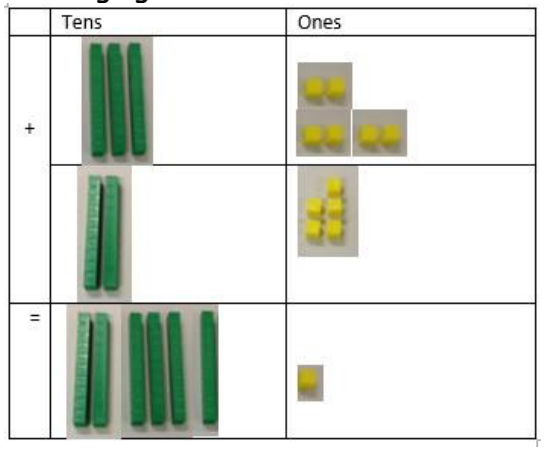
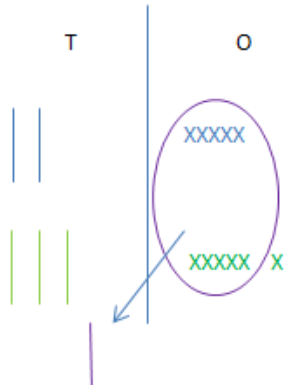
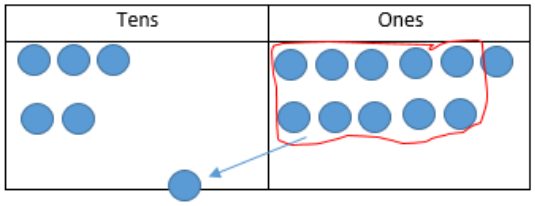
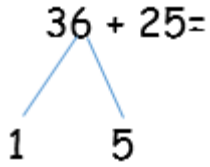
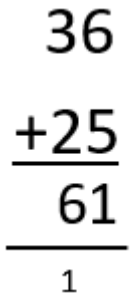
Should be completed in an average time frame of one minute per question, to replicate test expectations.

Year 3 – 5, **Friday** starters to be timetables practice (TTRS, TT Checker, TTO)

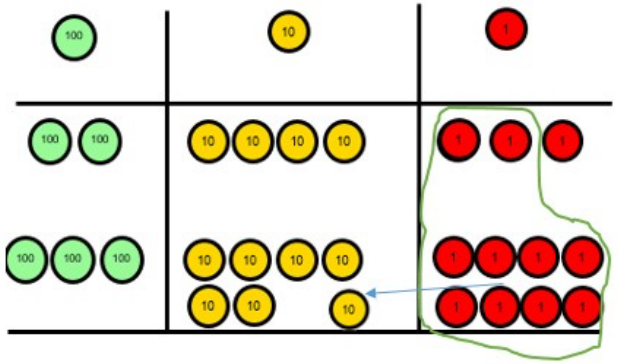
Addition-

Key language which should be used: sum, total, parts and wholes, plus, add, altogether, more than, 'is equal to' 'is the same as'

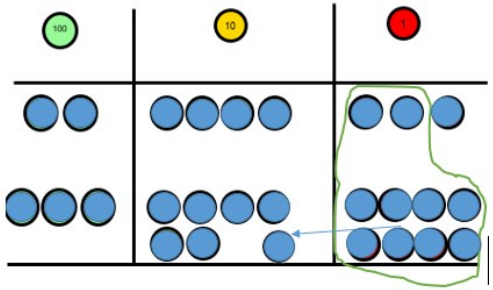
Concrete	Pictorial	Abstract
Combining two parts to make a whole (use other resources too e.g. eggs, shells, teddy bears etc)  		4 + 3 = 7 (four is a part, 3 is a part and the whole is seven) 
Counting on using number lines by using cubes or numicon  	A bar model which encourages the children to count on 	The abstract number line: What is 2 more than 4? What is the sum of 4 and 4? What's the total of 4 and 2? 4 + 2 
Regrouping to make 10 by using ten frames and counters/cubes or using numicon: 6 + 5  	Children to draw the ten frame and counters/cubes 	Children to develop an understanding of equality e.g. 6 + □= 11 and 6 + 5 = 5 + □ 6 + 5 = □+ 4

TO + O using base 10. Continue to develop understanding of partitioning and place value 41 + 8 	Children to represent the concrete using a particular symbol e.g. lines for tens and dot/crosses for ones. 	41 + 8  1 + 8 = 9 40 + 9 = 49 
TO + TO using base 10. Continue to develop understanding of partitioning and place value and use this to support addition. Begin with no exchanging. 36 + 25 	This could be done one of two ways:  	Looking for ways to make 10  5 + 5 = 10 30 + 20 = 50 50 + 10 + 1 = 61 Formal method: 

Use of place value counters to add HTO + TO, HTO + HTO etc. once the children have had practice with this, they should be able to apply it to larger numbers and the abstract



Children to represent the counters e.g. like the image below

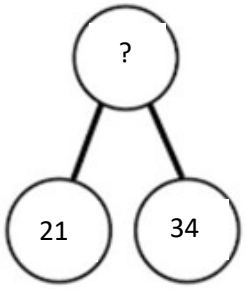


If the children are completing a word problem, draw a bar model to represent what it's asking them to do

?	
243	368

$$\begin{array}{r} 243 \\ +368 \\ \hline 611 \\ \hline 1\ 1 \end{array}$$

Fluency variation, different ways to ask children to solve 21+34:



Sam saved £21 one week and £34 another. How much did he save in total?

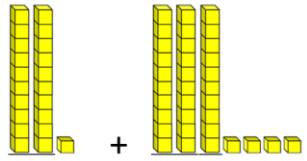
21+34=55. Prove it! (Reasoning but the children need to be fluent in representing this)

$$\begin{array}{r} 21 \\ +34 \\ \hline \\ \hline \end{array}$$

21 + 34 =

$\square$ = 21 + 34

What's the sum of twenty-one and thirty-four?

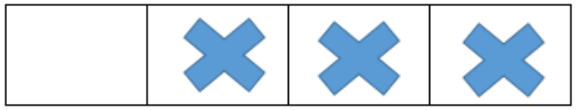
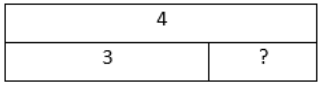
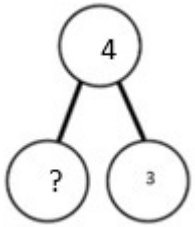
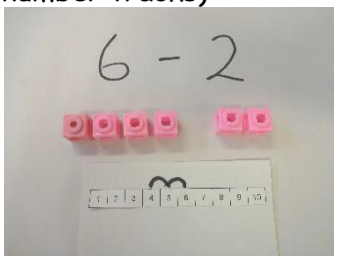
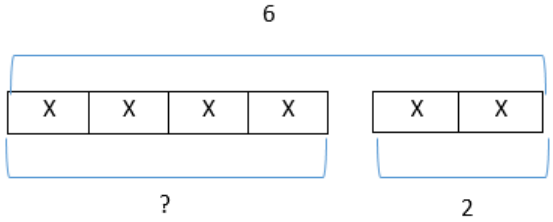
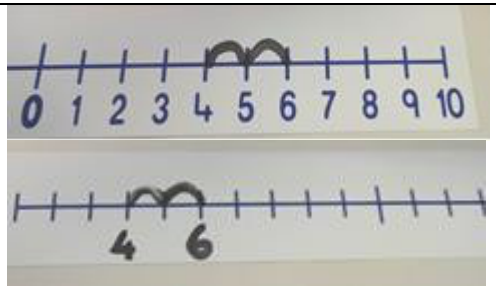


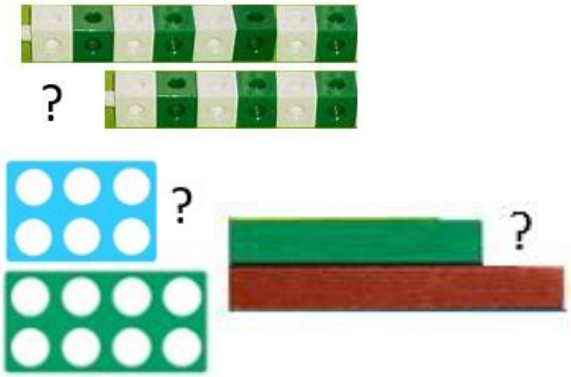
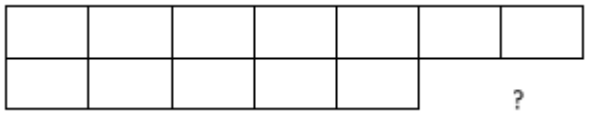
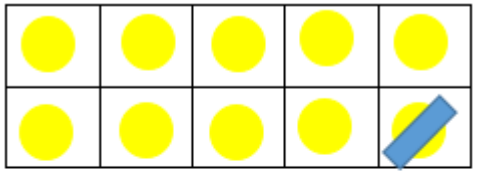
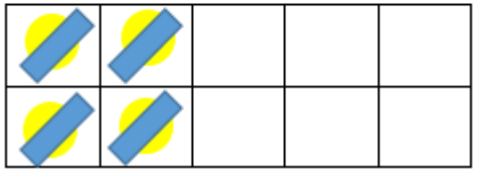
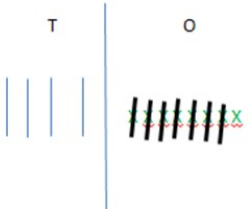
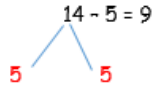
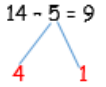
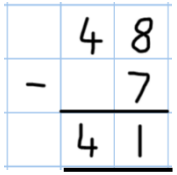
Always use missing digit problems too:

Tens	Ones
10 10	1
10 10 10	?
?	4

Subtraction-

Key language which should be used: take away, less than, the difference, subtract, minus, fewer, decrease, '7 take away 3, the difference is four'

Concrete	Pictorial	Abstract
Physically taking away and removing objects from a whole (use various objects too) rather than crossing out- children will physically remove the objects 4 – 3 = 1 	Children to draw the concrete resources they are using and cross out.  Use of the bar model: 	**4- 3 =** **= 4 – 3**  
Counting back (using number lines or number tracks) 	Children to represent what they see pictorially e.g. 	

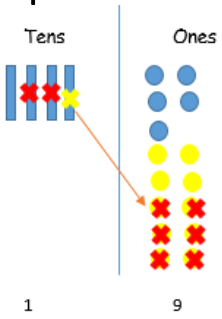
Finding the difference (using cubes, numicon or Cuisenaire rods, other objects can also be used) 	Children to draw the cubes/other concrete objects which they have used XXXXXXXX XXXXXX Use of the bar model 	Find the difference between 8 and 6. 8 – 6, the difference is ? Children to also explore why 9 - 7 = 8 – 6 (the difference, of each digit, has changed by 1 so the difference is the same- this will help when solving 10000-9987)
Making 10 (using numicon or ten frames) 14 – 5  Children could also do this by subtracting a 5 from the 10.  **Column method** (using base 10) 48-7 	Children to present the ten frames pictorially   	14 – 5 = 9 You also want children to see related facts e.g. 15 – 9 = 5 Children to represent how they have solved it e.g.  14 is made up of 5, 5 and 4 so I can subtract one 5 to be left with 4 and 5  5 is made up of 4 and 1 so I can subtract 4 to make 10 and then 1 to get to 9 48 – 7 = 

Column method (using base 10 and having to exchange)

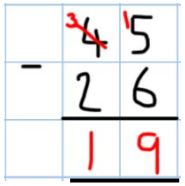
45-26

1) Start by partitioning 45
2) Exchange one ten for ten more ones
3) Subtract the ones, then the tens.

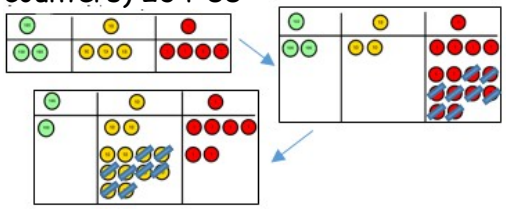
Represent the base 10 pictorially



It's crucial that the children understand that when they have exchanged the 10 they still have 45. 45 = 30 + 15

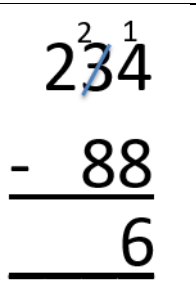


Column method (using place value counters) 234-88

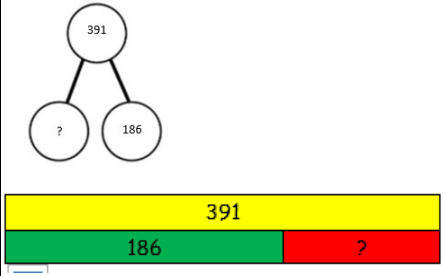


Once the children have had practice with the concrete, they should be able to apply it to any subtraction.

Like the other pictorial representations, children to represent the counters.



Fluency variation, different ways to ask children to solve 391-186:



Raj spent £391, Timmy spent £186. How much more did Raj spend?

I had 391 metres to run. After 186 I stopped. How many metres do I have left to run?

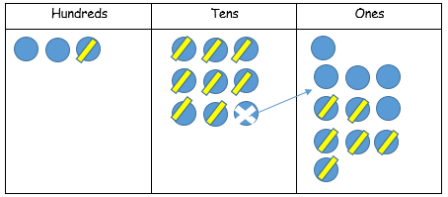
391 – 186

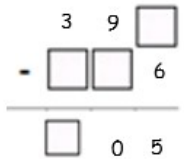
= 391 – 186

391
-186
———

Find the difference ebtween 391 and 186
Subtract 186 from 391.
What is 186 less than 391?

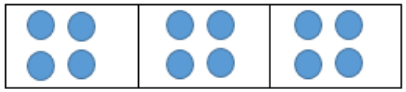
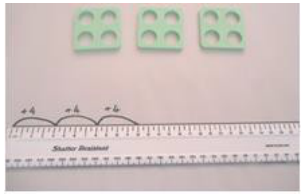
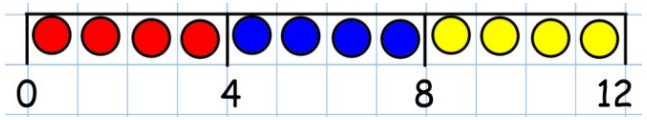
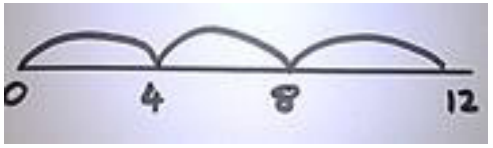
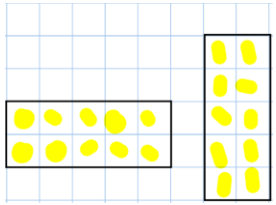
What's the calculation? What's the answer?

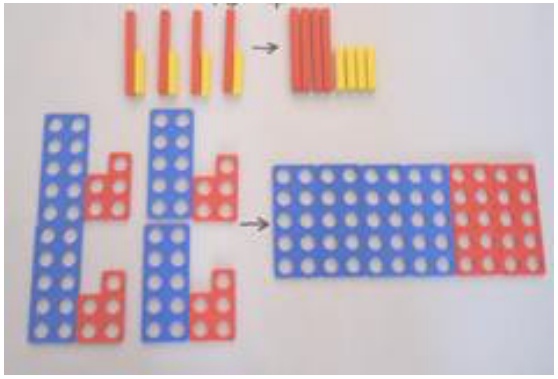
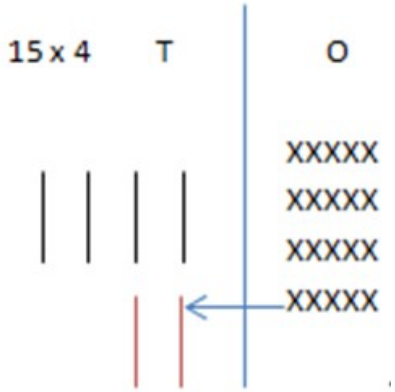
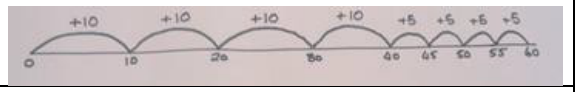
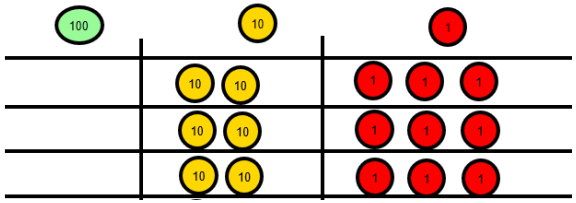
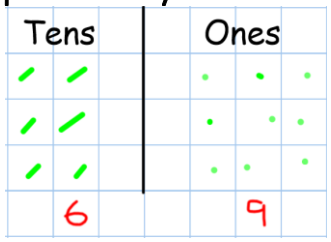




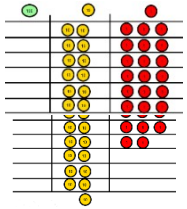
Multiplication-

Key language which should be used: double times, multiplied by, the product of, groups of, lots of, 'is equal to' 'is the same as'

Concrete	Pictorial	Abstract
Repeated grouping/repeated addition (does not have to be restricted to cubes) 4 x 3 or 4 three times or 3 lots of 4 	Children to represent the practical resources in a picture e.g. XX XX XX XX XX XX Use of a bar model for a more structured method 	4 x 3 4 + 4 + 4
Use number lines to show repeated groups- 4 x 3  	Represent this pictorially alongside a number line e.g: 	Abstract number line **4 x 3 = 12** 
Use arrays to illustrate commutativity (counters and other objects can also be used) **5 x 2 = 2 x 5**   	Children to draw the arrays 	Children to be able to use an array to write a range of calculations e.g. 2 x 5 = 10 5 x 2 = 10 2 + 2 + 2 + 2 + 2 = 10 5 + 5 =10

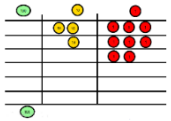
Partition to multiply (use numicon, base 10, Cuisenaire rods) 15 x 4 	Children to represent the concrete manipulatives in a picture e.g. base 10 can be represented like: 	Children to be encouraged to show the steps they have taken A number line can also be used 15 x 4 10 5 5 x 4 = 20 10 x 4 = 40 20 + 40 
Formal column method with place value counters or base 10 (at the first stage- no exchanging) 23 x 3 Make 23, 3 times. See how many ones, then how many tens 	**Children to represent the counters in a pictorial way** 	Children to record what it is they are doing to show understanding 23 x 3 20 3 3 x 3 = 9 20 x 3= 60 60 + 9= 69 23 x 3 69
Formal column method with place value counters (children need this stage, initially, to understand how the column method works)	Children to represent the counters/base 10, pictorially e.g. the image below.	**23 x 6** 3 x 6 = 18 20 x 6= 120 120 + 18 = 138

23 x 6

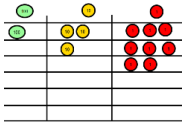


Step 1: get 6 lots of 23

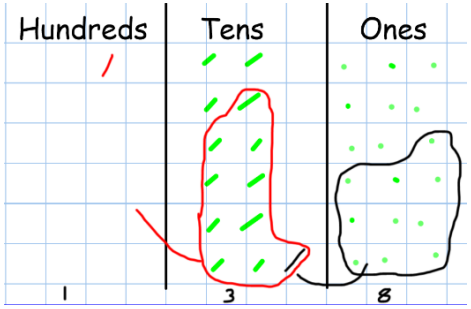
Step 2: 3 x 6 is 18. Can I make an exchange? Yes! Ten ones for one ten….



Step 3: 2 tens times 6 and my extra ten is 13 tens. Can I make an exchange? Yes! Ten tens for one hundred…



Step 4- what do I have I each column?



The aim is to get to the formal method but the children need to understand how it works.

23 x 6 =

$$\begin{array}{r} 23 \\ \times \quad 6 \\ \hline 138 \\ \hline 1 \end{array}$$

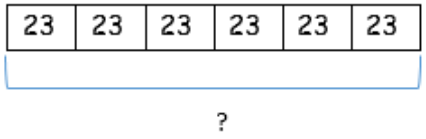
When children start to multiply 3d x 3d and 4d x 2d etc, they should be confident with the abstract:

To get 744 children have solved 124 x 6
To get 2480 they have solved 124 x 20

$$\begin{array}{rrrr} & 1 & 2 & 4 \\ \times & & 2 & 6 \\ \hline & {\scriptstyle 1}7 & 4 & {\scriptstyle 2}4 \\ 2 & {\scriptstyle 1}4 & 8 & 0 \\ \hline 3 & 2 & 2 & 4 \\ \hline 1 & 1 & & \end{array}$$

Answer: 3224

Fluency variation, different ways to ask children to solve 23 x 6:



With the counters, prove that 23 x 6 = 138

Why is 6 x 23 = 23 x 6?
They made an error here, which I have corrected.

Mai had to swim 23 lengths, 6 times a week. How many lengths did she swim in one week?

Tom saved 23p three days a week. How much did he save in 2 weeks?

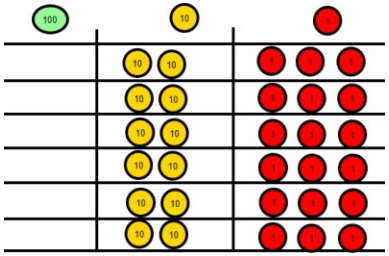
Find the product of 6 and 23

6 x 23 =

☐ = 6 x 23

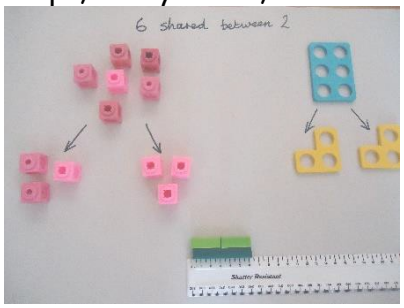
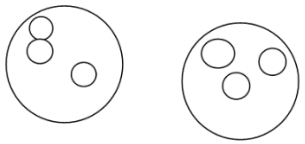
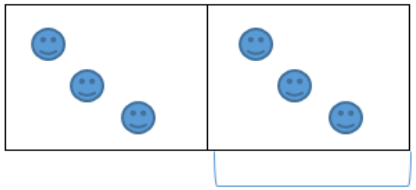
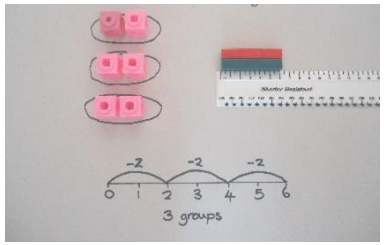
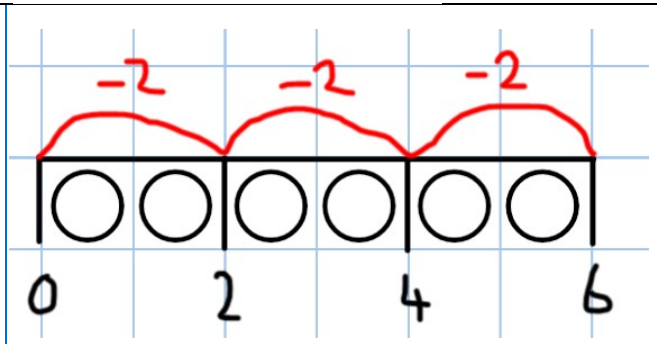
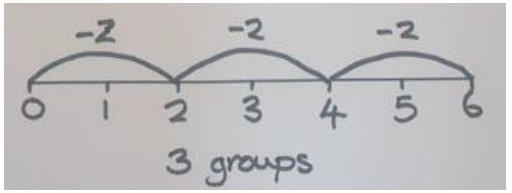
$$\begin{array}{r} 6 \\ \times\ 23 \\ \hline \end{array} \qquad \begin{array}{r} 23 \\ \times\ 6 \\ \hline \end{array}$$

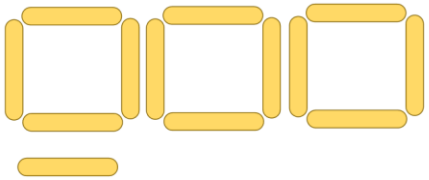
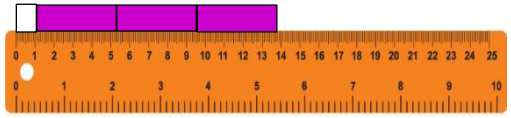
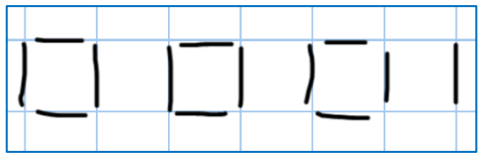
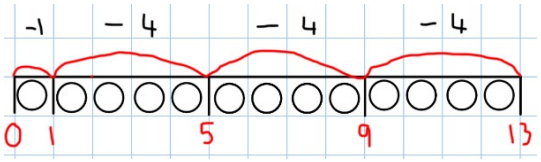
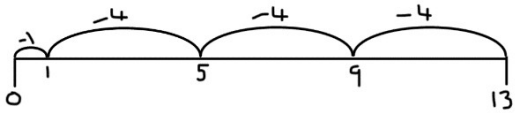
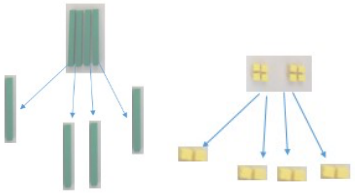
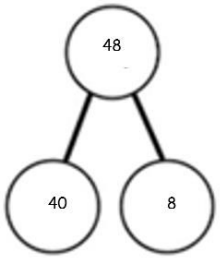
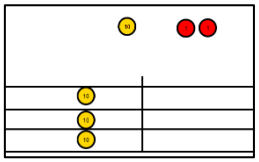
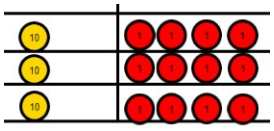
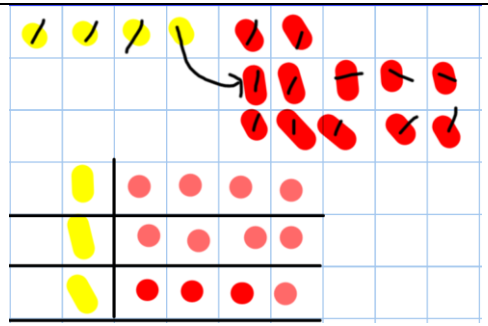
What's the calculation? What's the answer?



Division-

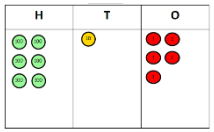
Key language which should be used: share, group, divide, divided by, half, 'is equal to' 'is the same as'

Concrete	Pictorial	Abstract
6 shared between 2 (other concrete objects can also be used e.g. children and hoops, teddy bears, cakes and plates) 	 This can also be done in a bar so all 4 operations have a similar structure: 	6 ÷ 2 = 3 What's the calculation? 3 | 3
Understand division as repeated grouping and subtracting 6 ÷ 2 		Abstract number line 
2d ÷ 1d with remainders 13 ÷ 4 – 3 remainder 1	Children to have chance to represent the resources they use in a pictorial way e.g. see below:	13 ÷ 4 – 3 remainder 1 Children to count their times tables facts in their heads

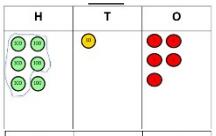
Use of lollipop sticks to form wholes  Use of Cuisenaire rods and rulers (using repeated subtraction) 	 	
2d divided by 1d using base 10 (no remainders) SHARING **48 ÷ 4 = 12**  Start with the tens.	Children to represent the base 10 and sharing pictorially.	48 ÷ 4 4 tens ÷ 4 = 1 ten 8 ones ÷ 4 = 2 ones  10 + 2 = 12
Sharing using place value counters. 42 ÷ 3= 14  1. Make 42. Share the 4 tens between 3. Can we make an exchange with the extra 10?  Exchange the ten for 10 ones and share out 12 ones		42 ÷ 3 42 = 30 + 12 30 ÷ 3 = 10 12 ÷ 3 = 4 10 + 4 = 14

Short division using grouping and counters. Key language for grouping- how many groups of X can we make with X hundreds'- ***this can also be done using sharing!***

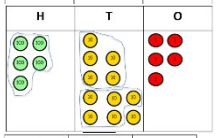
615 ÷ 5



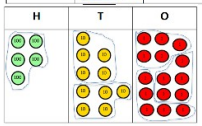
Step 1: make 615



Step 2: Circle your groups of 5



Step 3: Exchange 1H for 10T and circle groups of 5



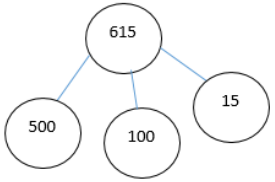
Step 4: exchange 1T for 10ones and circles groups of 5

This can easily be represented pictorially, till the children no longer to do it.
It can also be done to decimal places if you have a remainder!

$$5\overline{)615}\quad 123$$

Fluency variation, different ways to ask children to solve 615 ÷ 5:

Using the part whole model below, how can you divide 615 by 5 without using the 'bus stop' method?



I have £615 and share it equally between 5 bank accounts. How much will be in each account?

615 pupils need to be put into 5 groups. How many will be in each group?

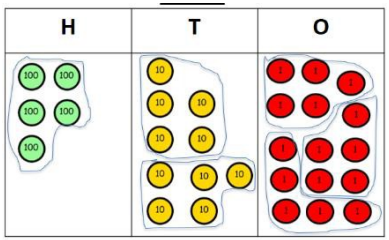
$5\overline{)615}$

615 ÷ 5 =

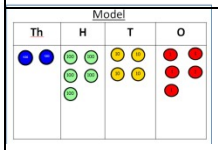
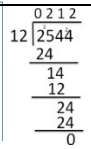
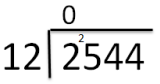
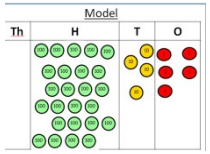
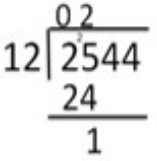
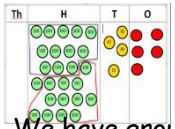
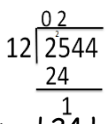
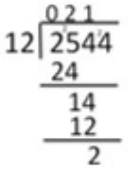
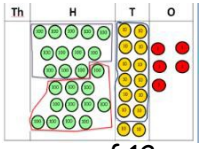
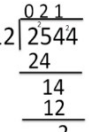
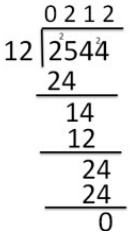
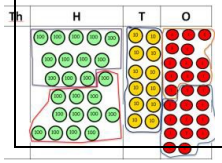
☐ = 615 ÷ 5

How many 5's go into 615?

What's the calculation? What's the answer?



Long division

Concrete	Pictorial	Abstract
  2544 ÷ 12 How many groups of 12 thousands do we have? None	Children to represent the counters, pictorially and record the subtractions beneath.	 Step one- exchange 2 thousand for 20 hundreds so we now have 25 hundreds.
 Exchange 2 thousand for 20 hundreds.		 Step two- How many groups of 12 can I make with 25 hundreds? The 24 shows the hundreds we have grouped. The one is how many hundreds we have left.
  How many groups of 12 are in 25 hundreds? 2 groups. Circle them. We have grouped 24 hundreds so can take them off and we are left with one.		 Exchange the one hundred for 10 tens. How many groups of 12 can I make with 14 tens? The 14 shows how many tens I have, the 12 is how many I grouped and the 2 is how many tens I have left.
  Exchange the one hundred for ten tens so now we have 14 tens. How many groups of 12 are in 14? 1 remainder 2.		 Exchange the 2 tens for 20 ones. The 24 is how many ones I have grouped and the 0 is what I have left.
 Exchange the two tens for twenty ones so now we have 24 ones. How many groups of 12 are in 24? 2		

Fractions *– Progression of fractions knowledge from year 3 through to year 6.*

Year 3

- Count up and down in tenths: recognise that tenths are from dividing an object into ten equal parts and dividing one-digit numbers or quantities by ten.
- Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions and use fractions as numbers.
- Recognise and show, using diagrams, equivalent fractions with small denominators.
- Add and subtract fractions with the same denominator.
- Compare and order unit fractions with the same denominators.

Year 4

- Count up and down in hundredths: recognise that hundredths arise when dividing an object by 100 and dividing tenths by 10.
- Recognise and write decimal equivalents to $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{3}{4}$.
- Recognise and write decimal equivalent of any number of tenths and hundredths.
- Recognise and show using diagrams, families of common equivalents.
- Add and subtract fractions with the same denominator.
- 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.
- Solve simple measure and money problems, involving fractions and decimals to two decimal places.

Year 5

- Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.
- Compare and order fractions whose denominators are all multiples of the same number.
- Recognise mixed numbers and improper fractions. Convert from one form to another and write mathematical statements > 1 as a mixed number.
- Add and subtract fractions with the same denominators and denominator that are multiples of the same numbers.
- Multiply fractions and mixed numbers by whole numbers, supported by materials and diagrams.
- Recognise and use tenths, hundredths and thousandths and relate tenths, hundredths and decimal equivalents.
- Recognise % symbols and understand the meaning: write % as a fraction, decimal and percentage.

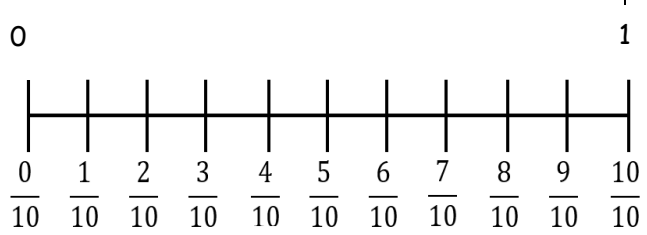
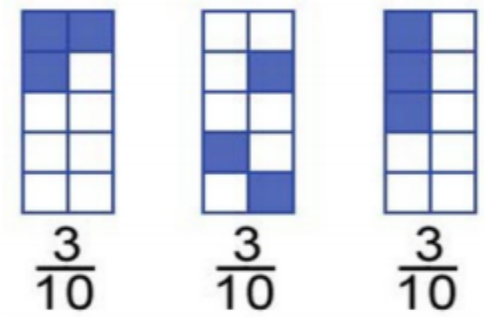
Year 6

- Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.
- Compare and order fractions, including > 1.
- Use common factors to simplify; use common multiples to express fractions in the same denomination.
- Multiply simple pairs of proper fractions, writing the answer in its simplest form.
- Recall and use equivalences between simply fractions, decimals and percentages, including indifferent contexts.
- Divide proper fractions by whole numbers.
- Find fractions and percentages of amounts.
- Associate fractions with division and calculate decimal fraction equivalents.

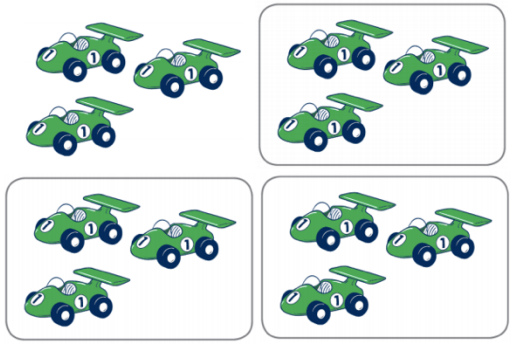
Year 3 Fractions

How can we progress with fractions?

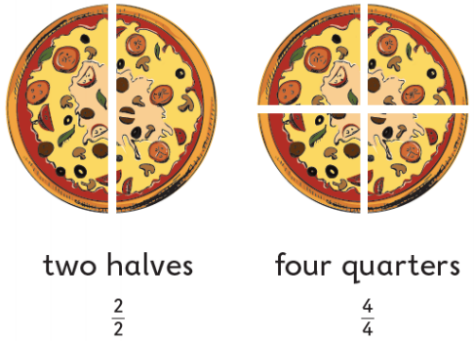
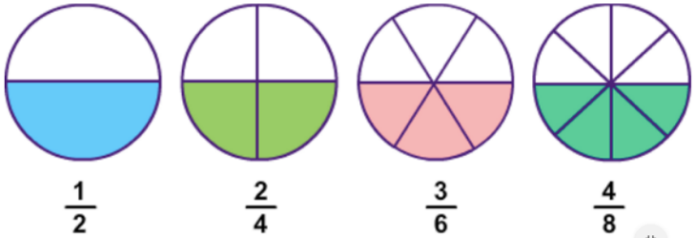
Count up and down in tenths: recognise that tenths arise from dividing an object into ten equal parts and dividing one-digit numbers or quantities by ten.

Concrete	Pictorial	Abstract
		$\frac{1}{10}$ of 6 = 0.6 because 6 ÷ 10 = 0.6 $\frac{1}{10}$ of 7 = 0.7 because 7 ÷ 10 = 0.7

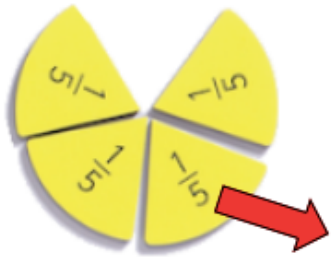
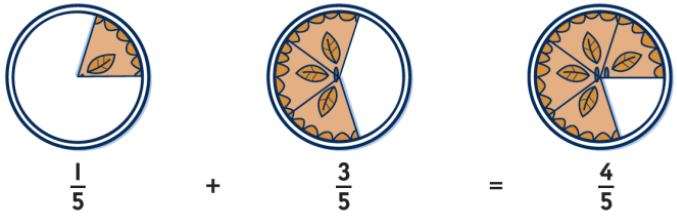
Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions and use fractions as numbers.

Concrete	Pictorial	Abstract
$\frac{1}{8}$ 	$\frac{3}{4}$ 	$\frac{1}{5}$ of 15 sweets = 3 because 15 ÷ 5 = 3 $\frac{2}{5}$ of 15 sweets = 6 because 15 ÷ 5 = 3 and 3 x 2 = 6

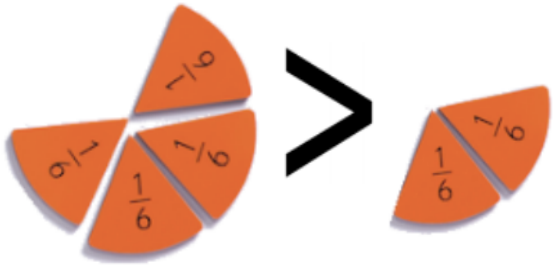
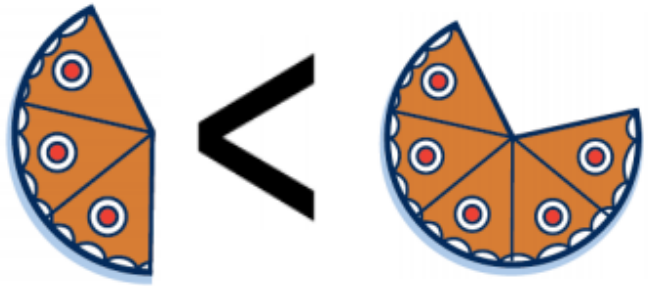
Recognise and show, using diagrams, equivalent fractions with small denominators.

Concrete	Pictorial	Abstract
		Candice says that two quarters is the same as one half. Is she correct? How do you know?

Add and subtract fractions with the same denominator.

Concrete	Pictorial	Abstract
 $\frac{1}{5}$		$\frac{3}{8} + \frac{2}{8} = \frac{5}{8}$ $\frac{6}{7} - \frac{3}{7} = \frac{3}{7}$

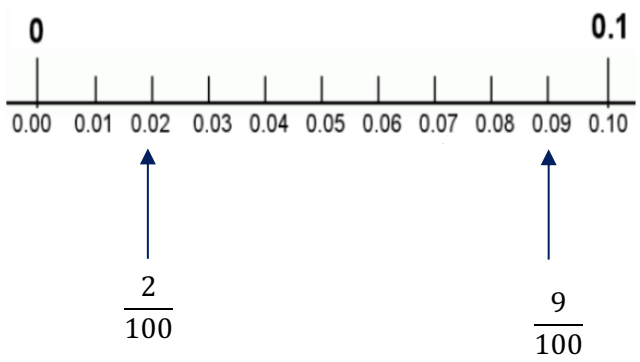
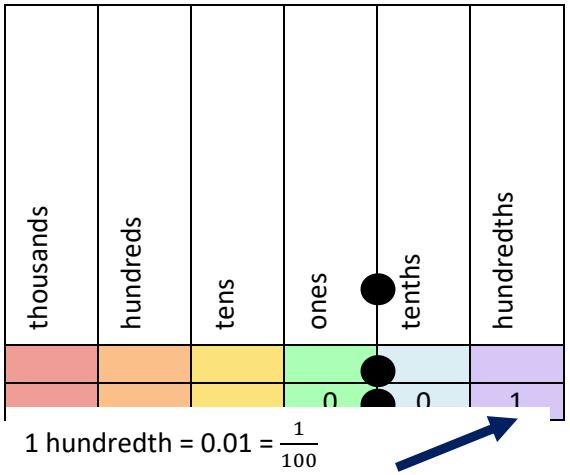
Compare and order unit fractions with the same denominators.

Concrete	Pictorial	Abstract
		Order from smallest to biggest $\frac{2}{8}$ $\frac{3}{8}$ $\frac{5}{8}$ $\frac{7}{8}$

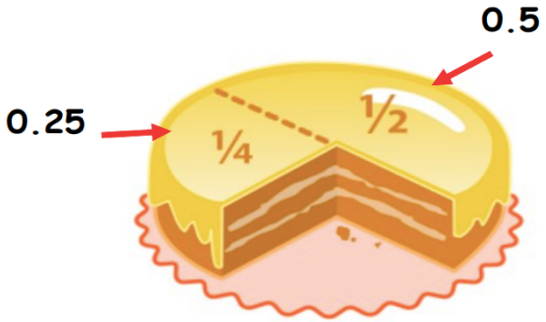
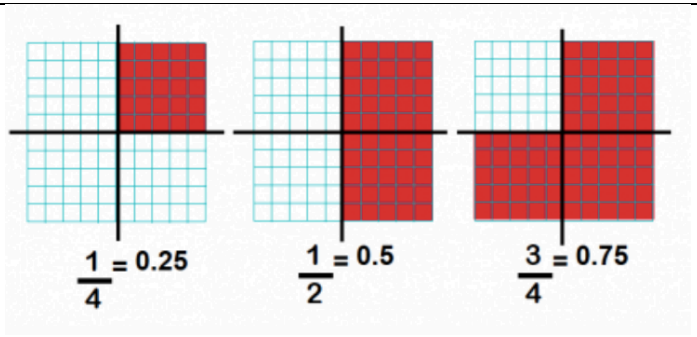
Year 4 Fractions

How can we progress with fractions?

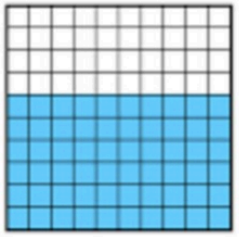
Count up and down in hundredths: recognise that hundredths arise when dividing an object by 100 and dividing tenths by 10.

Concrete	Pictorial	Abstract
		$\frac{1}{100}$ of 60 = 0.6 because 60 ÷ 100 = 0.6 $\frac{1}{10}$ of 70 = 0.7 so $\frac{1}{100}$ of 70 = 0.07

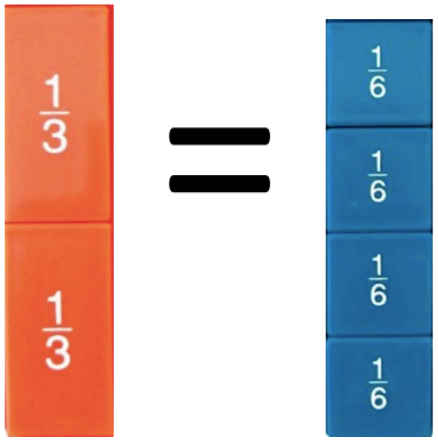
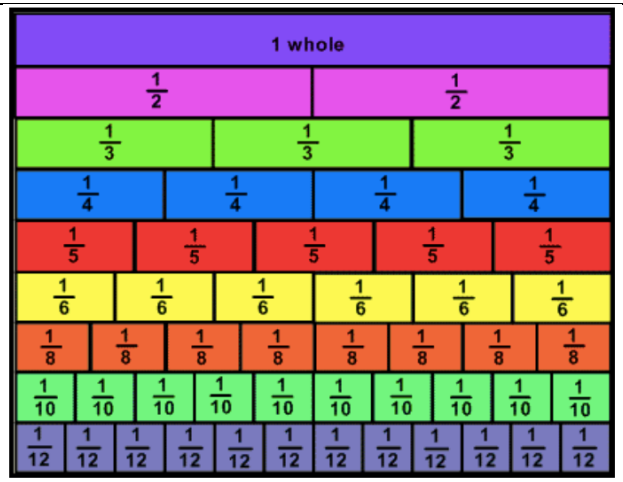
Recognise and write decimal equivalents to $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{3}{4}$.

Concrete	Pictorial	Abstract
		0.25 = $\frac{1}{4}$ 0.50 = $\frac{2}{4}$ = $\frac{1}{2}$ 0.75 = $\frac{3}{4}$

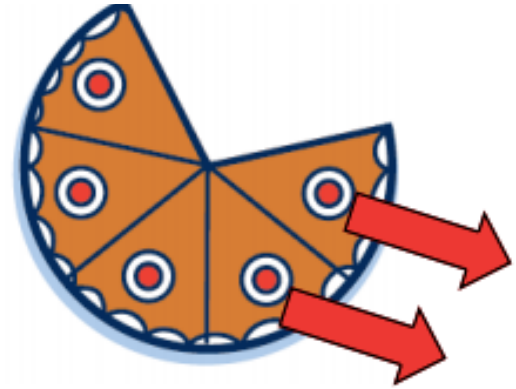
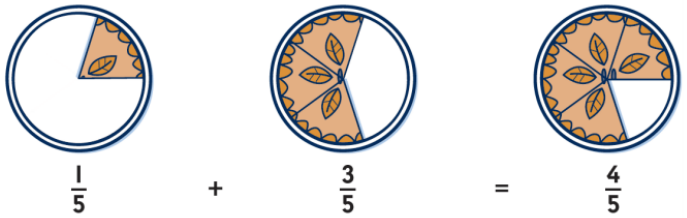
Recognise and write decimal equivalent of any number of tenths and hundredths.

Concrete	Pictorial	Abstract
 $\frac{1}{10}$ = of the chocolate bar = 0.1	 0.6 six tenths  0.60 sixty hundredths	$0.1 = \frac{1}{10}$ $0.3 = \frac{3}{10}$ $0.5 = = \frac{5}{10} = \frac{1}{2}$ $0.08 = \frac{8}{100}$

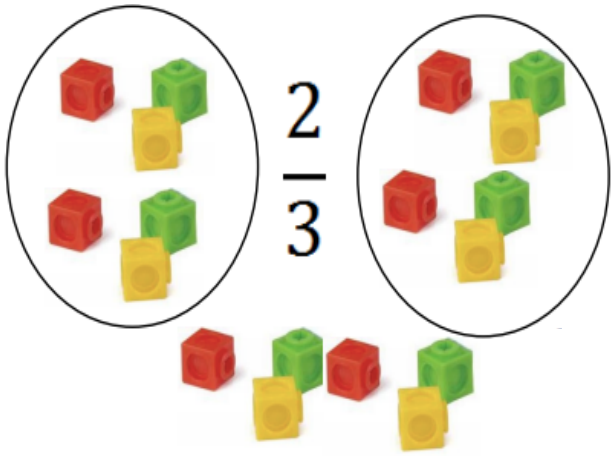
Recognise and show using diagrams, families of common equivalents.

Concrete	Pictorial	Abstract
		$\frac{2}{3} = \frac{4}{6} = \frac{8}{12}$ $\frac{3}{5} = \frac{6}{10}$ $\frac{2}{12} = \frac{1}{6}$

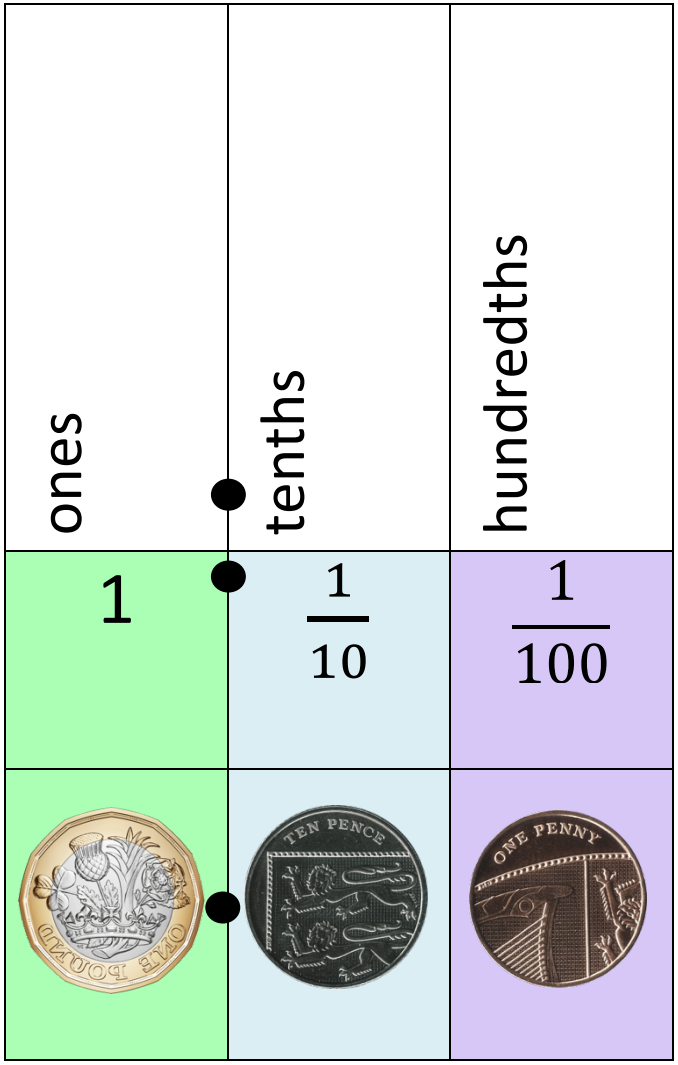
Add and subtract fractions with the same denominator.

Concrete	Pictorial	Abstract
 $\frac{2}{7}$,	 $\frac{1}{5}$ + $\frac{3}{5}$ = $\frac{4}{5}$	Candice eats $\frac{2}{7}$ of a whole pizza. How much does he have left? Alex and Lois both eat $\frac{3}{8}$ of a cake. How much have they eaten altogether?

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.

Concrete	Pictorial	Abstract
 $\frac{2}{3}$	$\frac{2}{3}$  $\frac{1}{3}$	$\frac{2}{3}$ of £18 £18 ÷ 3 = £6 £6 x 2 = £12

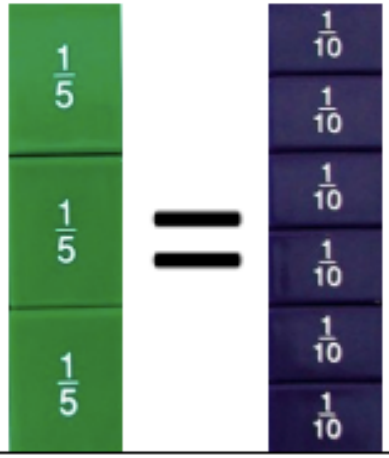
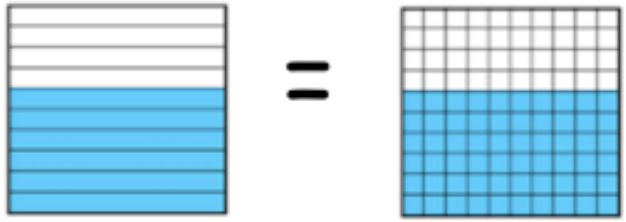
Solve simple measure and money problems, involving fractions and decimals to two decimal places.

Concrete	Pictorial	Abstract
		100cm = 1m 50cm = $\frac{1}{2}$ = 0.5m 25cm = $\frac{1}{4}$ = 0.25m 10cm = $\frac{1}{10}$ = 0.1m 30cm = $\frac{3}{10}$ = 0.3m

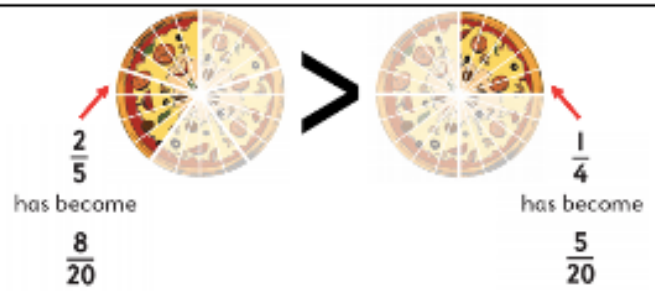
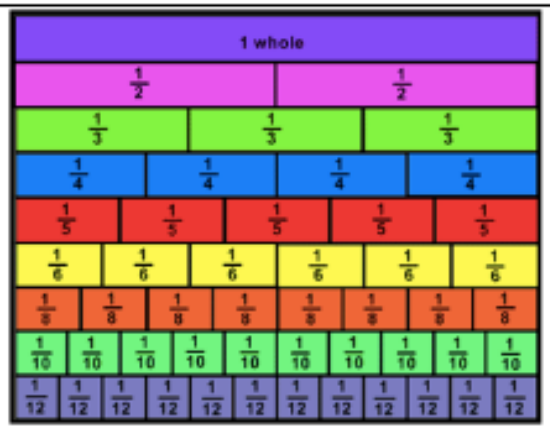
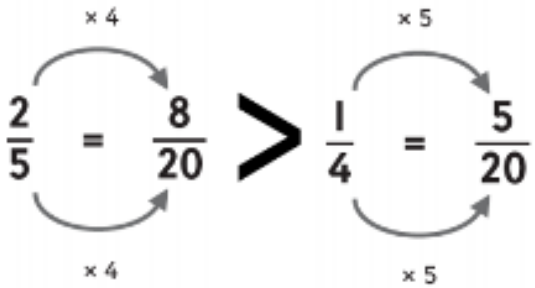
Year 5 Fractions

How can we progress with fractions?

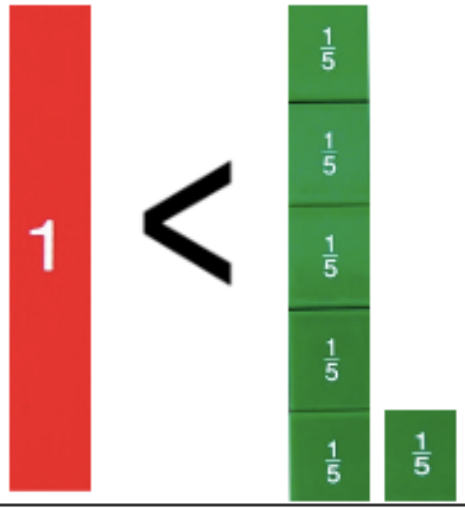
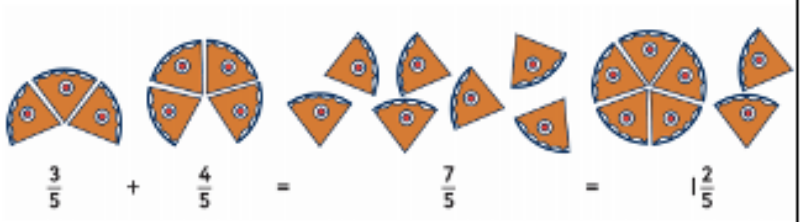
Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.

Concrete	Pictorial	Abstract
	 $\frac{6}{10} = \frac{60}{100}$	$\frac{3}{5} = \frac{6}{10} = \frac{6}{100}$ $\frac{3}{4} = \frac{75}{100}$ $\frac{1}{5} = \frac{2}{10} = \frac{20}{100}$

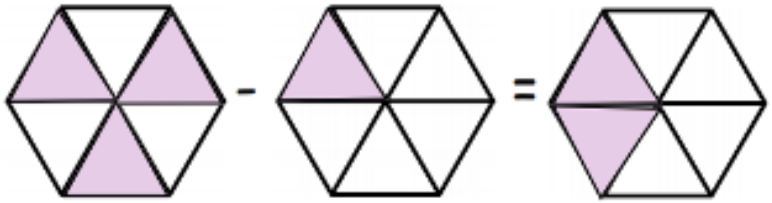
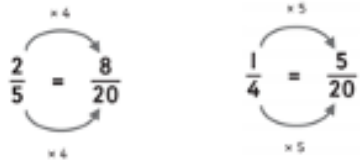
Compare and order fractions whose denominators are all multiples of the same number.

Concrete	Pictorial	Abstract
		

Recognise mixed numbers and improper fractions. Convert from one form to another and write mathematical statements > 1 as a mixed number.

Concrete	Pictorial	Abstract
		$\frac{7}{2} = 3\frac{1}{2}$ because 7 ÷ 2 = 3 with 1 half left over $2\frac{1}{3} = \frac{7}{3}$ because 2 x 3 = 6 with 1 third left to add

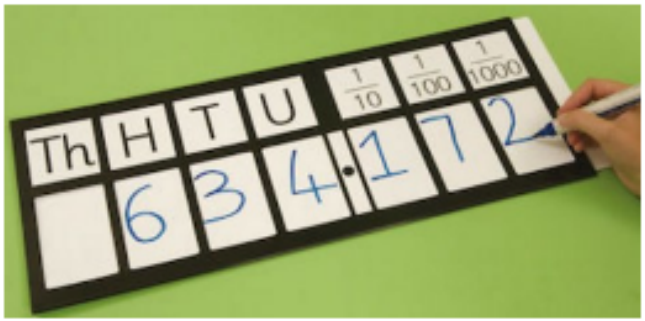
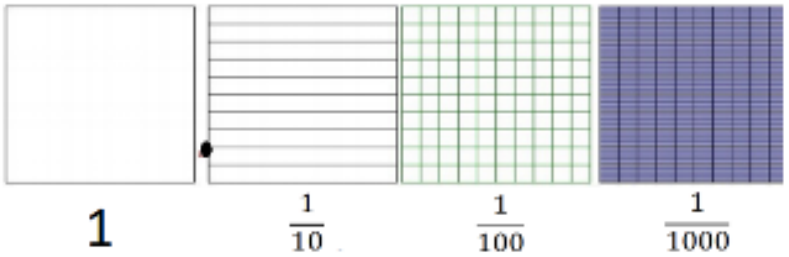
Add and subtract fractions with the same denominators and denominator that are multiples of the same numbers.

Concrete	Pictorial	Abstract
 So, $\frac{8}{20} + \frac{5}{20} = \frac{13}{20}$ $\frac{2}{5} + \frac{1}{4} = \frac{13}{20}$		$\frac{2}{5} - \frac{1}{4}$  So, $\frac{8}{20} - \frac{5}{20} = \frac{3}{20}$ $\frac{2}{5} - \frac{1}{4} = \frac{3}{20}$

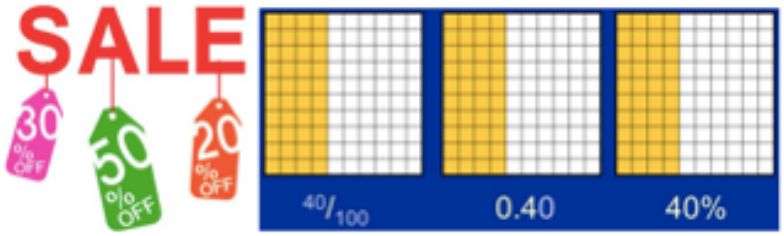
Multiply fractions and mixed numbers by whole numbers, supported by materials and diagrams.

Concrete	Pictorial	Abstract
 6 lots of $\frac{3}{4}$	 $4\frac{2}{4}$ altogether	Multiply a fraction by a whole number: $\frac{3}{4} \times 6 = \frac{3}{4} \times \frac{6}{1} = \frac{18}{4}$ Changed into a mixed number: $\frac{18}{4} = 4\frac{2}{4}$

Recognise and use tenths, hundredths and thousandths and relate tenths, hundredths and decimal equivalents.

Concrete	Pictorial	Abstract
		67.153 How many thousandths does this number have? How many more thousandths do you need to add to make 67.16?

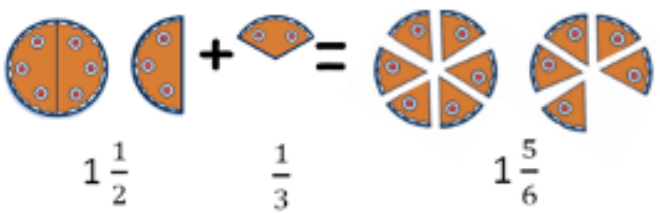
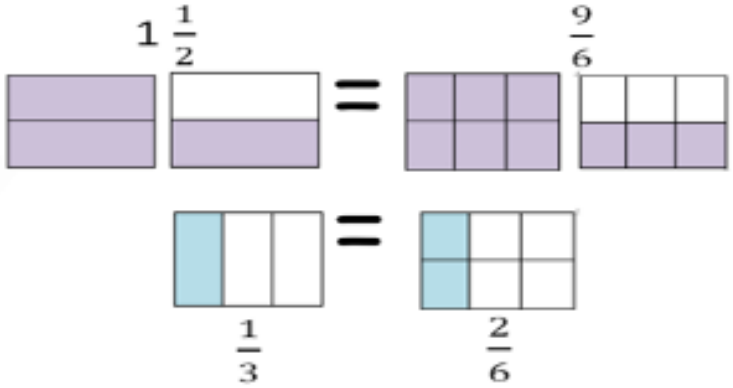
Recognise % symbols and understand the meaning: write % as a fraction, decimal and percentage.

Concrete	Pictorial	Abstract
		$\frac{4}{10} = 0.4 = 40\%$ $\frac{32}{100} = 0.32 = 32\%$ $\frac{75}{100} = 0.75 = 75\%$ $\frac{2}{25} = \frac{8}{100} = 0.08 = 8\%$

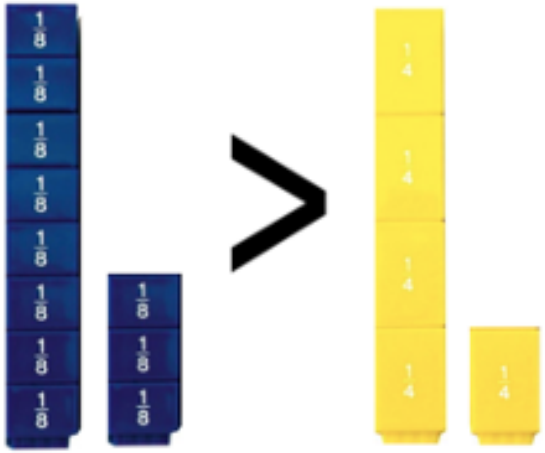
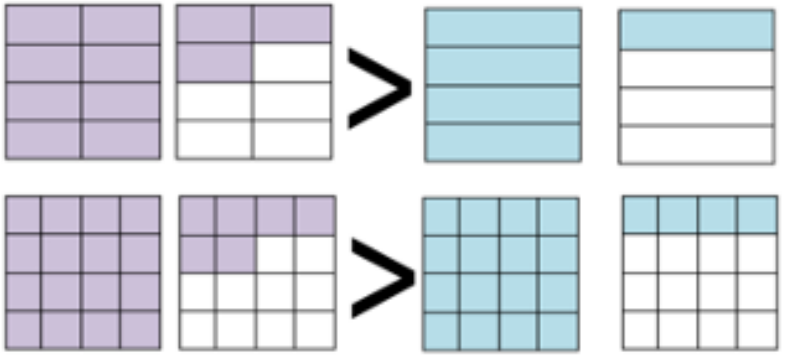
Year 6 Fractions

How can we progress with fractions?

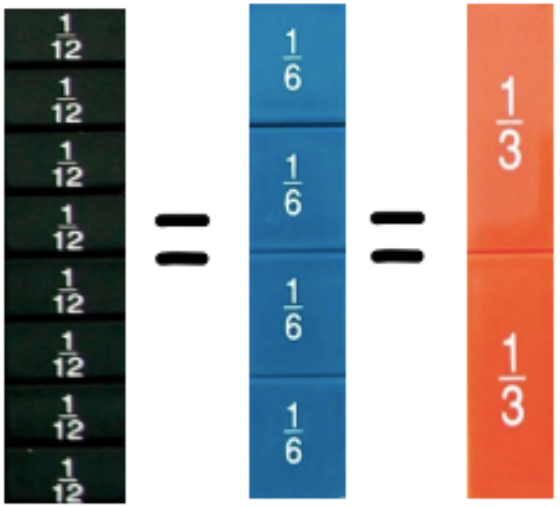
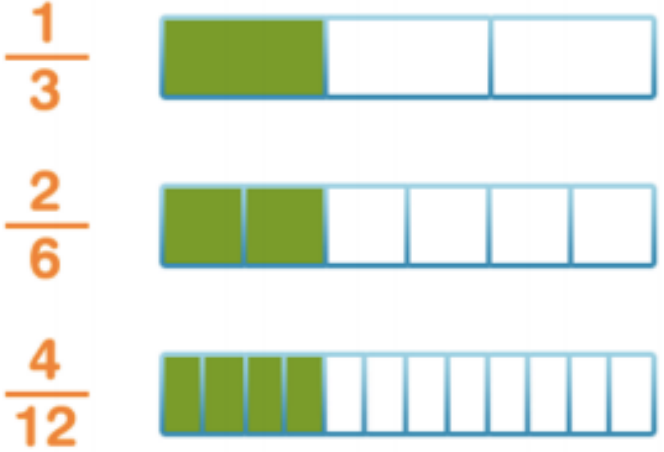
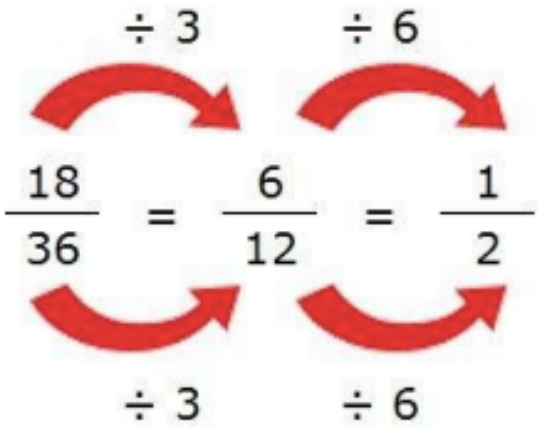
Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.

Concrete	Pictorial	Abstract
		$1\frac{1}{2}+\frac{1}{3}=1\frac{5}{6}$ because $1\frac{1}{2}=\frac{3}{2}$ $\frac{3}{2}=\frac{9}{6}$ and $\frac{1}{3}=\frac{2}{6}$ so $\frac{9}{6}+\frac{2}{6}=\frac{11}{6}=1\frac{5}{6}$

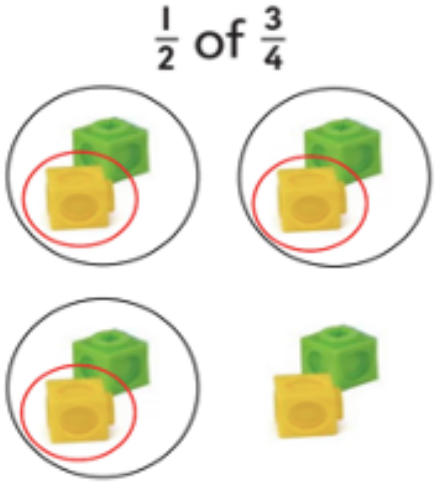
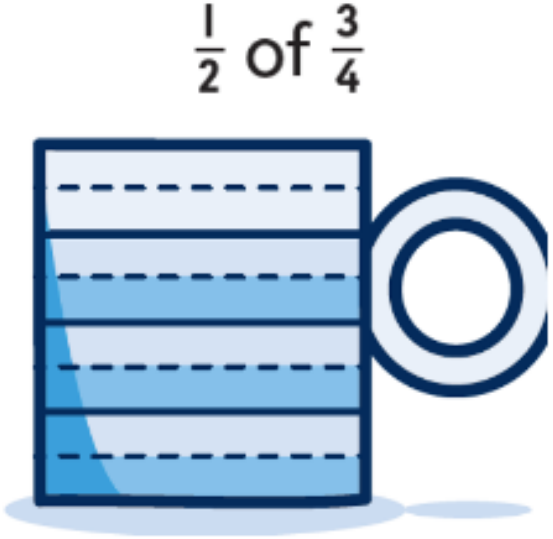
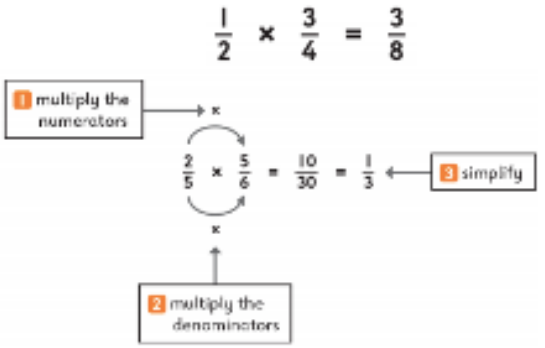
Compare and order fractions, including fractions > 1

Concrete	Pictorial	Abstract
		Which is greater? $\frac{2}{8}<\frac{6}{16}$ Ordering from smallest to larges by using equivalent fractions: $\frac{5}{12}, \frac{2}{3}, \frac{5}{6}$ $\frac{5}{12}, \frac{8}{12}, \frac{10}{12}$

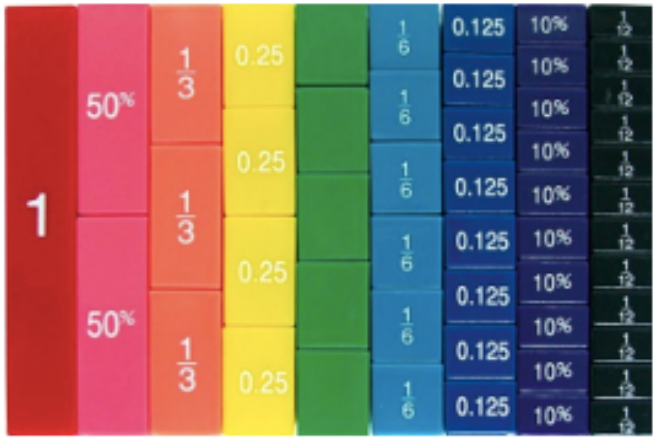
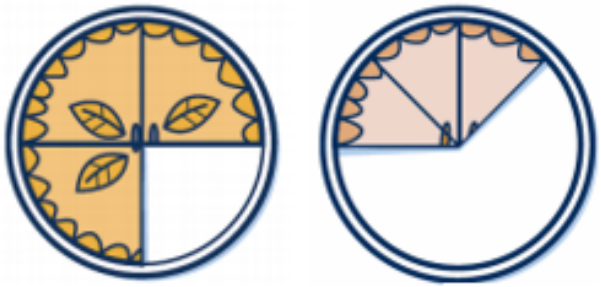
Compare and order fractions, including fractions > 1

Concrete	Pictorial	Abstract
		

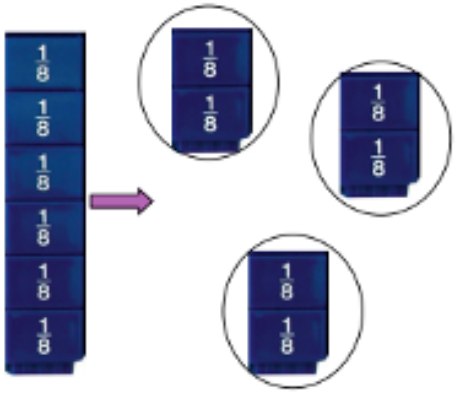
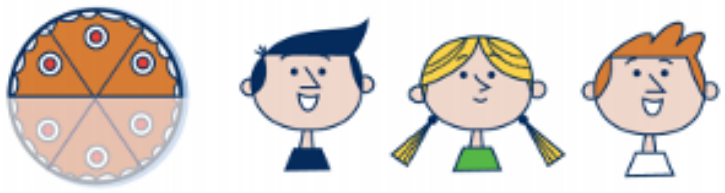
Multiply simple pairs of proper fractions, writing the answer in its simplest form.

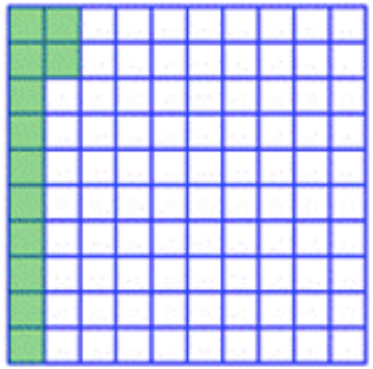
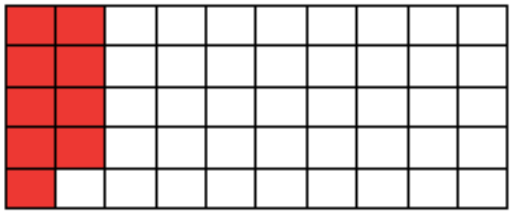
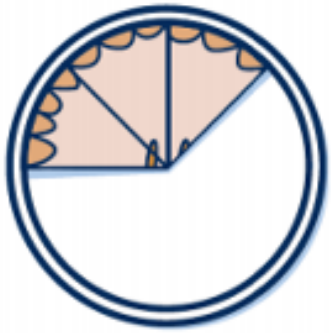
Concrete	Pictorial	Abstract
		

Recall and use equivalences between simple fractions, decimals and percentages including in different contexts.

Concrete	Pictorial	Abstract
	Which would you prefer 75% or $\frac{3}{8}$ of a pie?  75% $\frac{3}{8}$	Lois scored $\frac{40}{80}$ in her spelling test and Katy scored 40%. Who scored more? Lois = $\frac{40}{80}$ = 50% Katy = 40% One paving slab is 0.3m long and another is $\frac{1}{4}$ of a metre. Which is larger? $\frac{1}{4}$ = 0.25m 0.3m is larger than 0.25m

Divide proper fractions by whole numbers.

Concrete	Pictorial	Abstract
	 $\frac{1}{2} \div 3 = \frac{1}{6}$	$\frac{1}{2} \div 3 = \frac{1}{6}$ Keep it, change it, flip it! $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$

Finding percentages of amounts.		
Concrete	**Pictorial**	**Abstract**
12% of 100 = 12 out of 100 	£10 of £50 = $\frac{1}{5}$ = 20% 	Find 22% of 2400 = 528 10% = 2400 ÷ 10 = 240 240 x 2 = 480 1% = 2400 ÷ 100 = 24 24 x 2 = 48 480 + 48 = 528
Associate fractions with division and calculate decimal fraction equivalents		
Concrete	**Pictorial**	**Abstract**
	3 slices of pie 'out of' 8  $\frac{3}{8}$	$\frac{3}{8}$ 3 'out of' 8 is the same as 3 'divided by' 8. 3 ÷ 8 = 0.375 So $\frac{3}{8}$ = 0.375