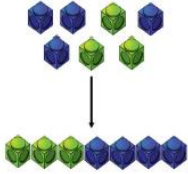
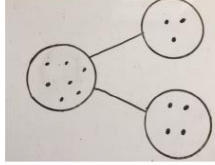
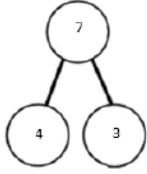
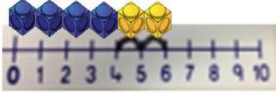

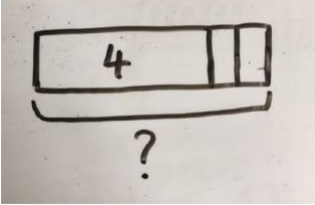
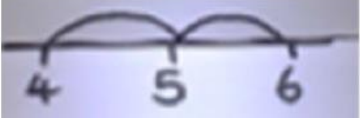
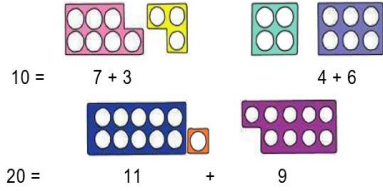
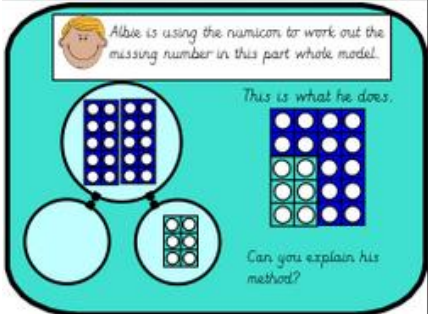
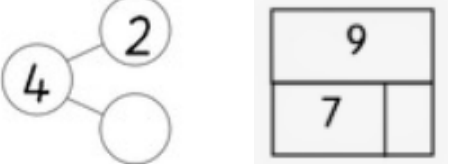
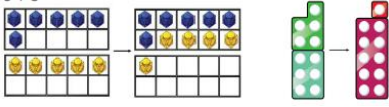
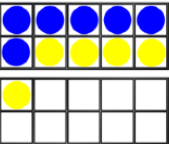
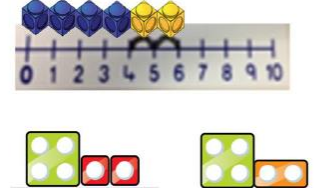
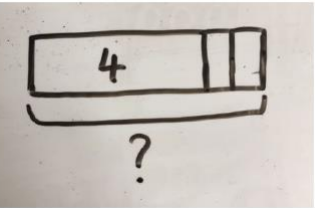
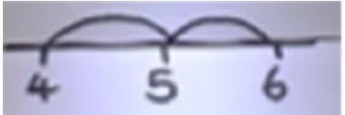

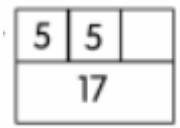
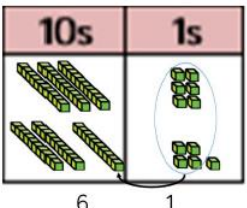
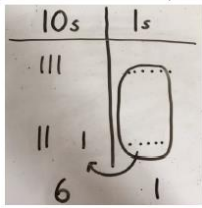
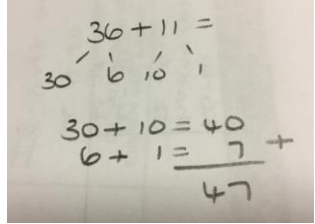

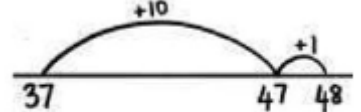
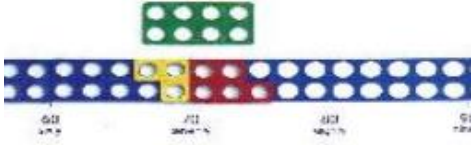
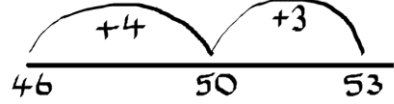


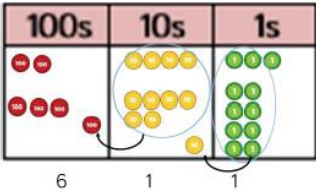
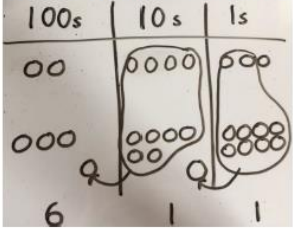
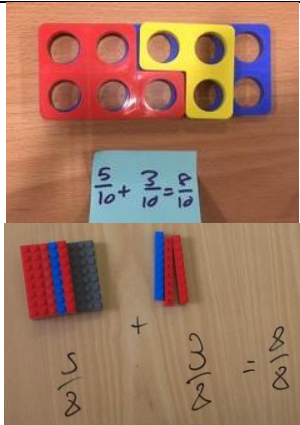
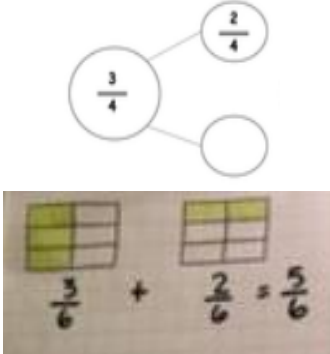
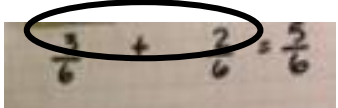
Addition Strategies

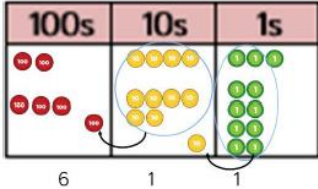
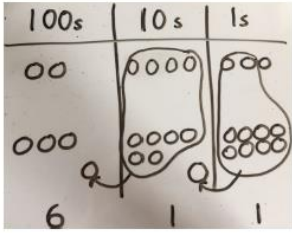
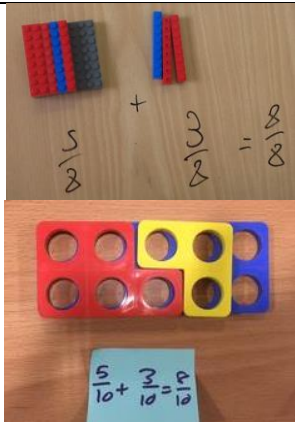

Key language: sum, total, parts and wholes, plus, add, altogether, more, 'is equal to' 'is the same as'.

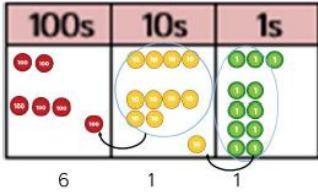
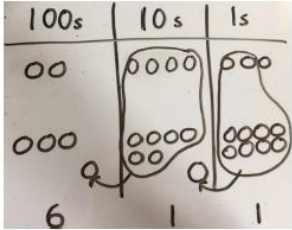
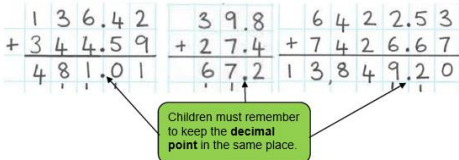
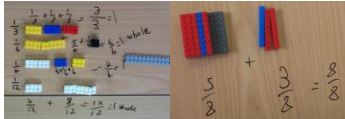
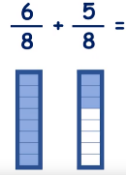
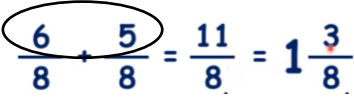
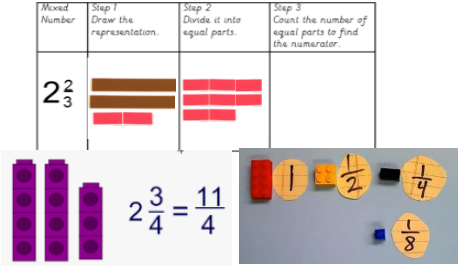
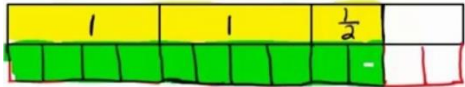
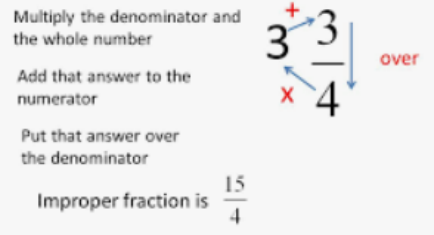
Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Written/Mental Representations
R	<p>Finds the total number of items in two groups by counting all of them.</p> <p>Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.</p>	Combining two parts to make a whole: part whole model	<p>Combining two parts to make a whole (use other resources too e.g. eggs, shells, teddy bears, cars).</p> 	<p>Children to represent the cubes using dots or crosses. They could put each part on a part whole model too.</p> 	<p>$4 + 3 = 7$ Four is a part, 3 is a part and the whole is seven.</p> 
		Starting at the bigger number and counting on- using cubes, numicon and number lines	<p>Counting on using number lines using cubes or Numicon.</p>  	<p>A bar model which encourages the children to count on, rather than count all.</p> 	<p>The abstract number line: What is 2 more than 4? What is the sum of 2 and 4? What is the total of 4 and 2? $4 + 2$</p> 

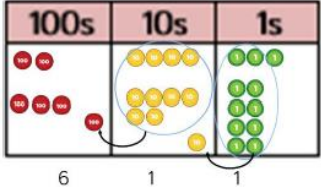
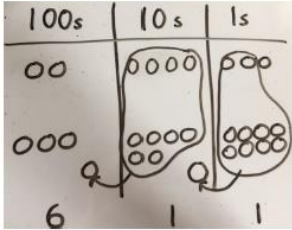
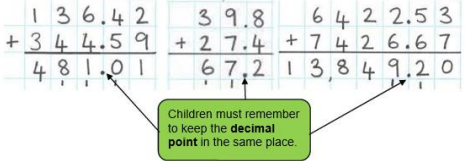
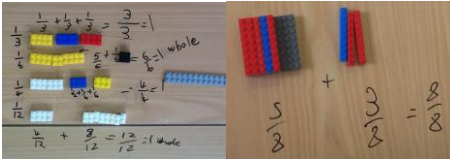

Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Written/Mental Representations
1	<p>Represent and use number bonds and related subtraction facts within 20</p> <p>Add and subtract one-digit and two-digit numbers to 20, including zero</p> <p>Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs</p> <p>Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = * - 9$</p>	<p>Combining two parts to make a whole: part whole model.</p>	 <p>10 = 7 + 3 4 + 6</p> <p>20 = 11 + 9</p>	<p>Children represent the numicon using dots or crosses. They put each part on a part-whole model</p> 	<p>Children use part-whole models to work out and record missing numbers and totals</p> 
		<p>Regrouping to make 10 using ten frame</p>	<p>Regrouping to make 10; using ten frames and counters/cubes or using Numicon.</p> <p>6 + 5</p> 	<p>Children to draw the ten frame and counters/cubes.</p> 	<p>Children to develop an understanding of equality e.g.</p> <p>$6 + \square = 11$</p> <p>$6 + 5 = 5 + \square$</p> <p>$6 + 5 = \square + 4$</p>
		<p>Starting at the bigger number and counting on- using cubes, numicon and number lines</p>	<p>Counting on using number lines using cubes or Numicon.</p> 	<p>A bar model which encourages the children to count on, rather than count all.</p> 	<p>The abstract number line:</p> <p>What is 2 more than 4?</p> <p>What is the sum of 2 and 4?</p> <p>What is the total of 4 and 2?</p> <p>$4 + 2$</p> 

Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Written/Mental Representations
2	<p>Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100</p> <p>Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:</p> <ul style="list-style-type: none"> * a two-digit number and ones * a two-digit number and tens * two two-digit numbers * adding three one-digit numbers 	Adding three single digits	<p>Look for the bond to 10 first.</p> $4 + 2 + 6 =$ 	 <p>Children represent using a part-whole models, identifying bonds to 10 to support</p>	$\square = 8 + 5 + 2$ $8 + 5 + 2 = \square$
	<p>Solve problems with addition and subtraction:</p> <ul style="list-style-type: none"> * using concrete objects and pictorial representations, including those involving numbers, quantities and measures * applying their increasing knowledge of mental and written methods 	<p>Use of base 10 to combine two numbers: partitioning tens and ones to add</p>	<p>TO + TO using base 10. Continue to develop understanding of partitioning and place value.</p> $36 + 25$ 	<p>Children to represent the base 10 in a place value chart.</p> 	<p>Introduction to column addition</p> 
	<p>Solve problems with addition and subtraction:</p> <ul style="list-style-type: none"> * using concrete objects and pictorial representations, including those involving numbers, quantities and measures * applying their increasing knowledge of mental and written methods 	<p>Use of base 10 to combine two numbers: adding 10 and adjusting</p>	 $37 + 11 =$ $37 + 10 = 47$ $47 + 1 = 48$	 $37 + 11 = 48$	<p>To complete calculations presented in a range of ways mentally by adding 10 and adjusting:</p> $37 + 9 = ?$ $11 + 27 = ?$ $? = 9 + 45$ $78 = ? + 9$
	<p>Solve problems with addition and subtraction:</p> <ul style="list-style-type: none"> * using concrete objects and pictorial representations, including those involving numbers, quantities and measures * applying their increasing knowledge of mental and written methods 	<p>Use of base 10 to combine two numbers: bridging through 10</p>	 <p>Use numicon on a number track to show how to bridge through ten by partitioning and recombining ones.</p>	$46 + 7 =$ 	<p>To complete calculations presented in a range of ways mentally by bridging through ten:</p> $36 + 8 = ?$ $4 + 27 = ?$ $? = 12 + 32$ $? = 47 + 9$

Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Written/Mental Representations
3	<p>Add and subtract numbers mentally, including:</p> <ul style="list-style-type: none"> * a three-digit number and ones * a three-digit number and tens * a three-digit number and hundreds <p>Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction</p> <p>Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction</p>	Place value counters leading to column addition	<p>Use of place value counters to add HTO + TO, HTO + HTO etc. When there are 10 ones in the 1s column- we exchange for 1 ten, when there are 10 tens in the 10s column- we exchange for 1 hundred.</p> 	<p>Children to represent the counters in a place value chart, circling when they make an exchange.</p> 	$\begin{array}{r} 243 \\ +368 \\ \hline 611 \\ \hline 11 \end{array}$
	<p>Add and subtract fractions with the same denominator within one whole (e.g. $\frac{5}{10} + \frac{3}{10} = \frac{8}{10}$)</p>	Part whole models leading to addition of numerators		 <p>Children draw part-whole models to support addition of numerators</p>	 <p>Add the numerators together to create a proper fraction. The denominator stays the same.</p>

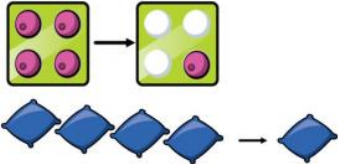
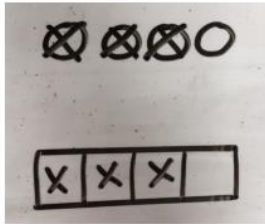

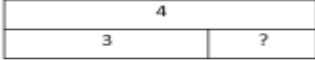
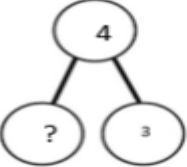
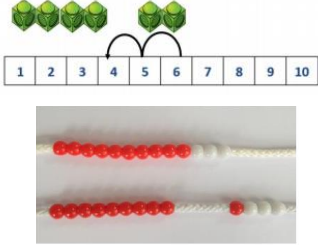
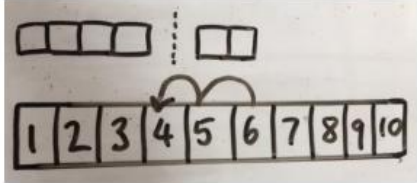
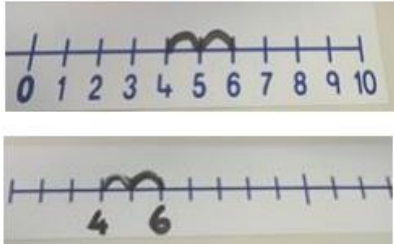
Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Written/Mental Representations
4	<p>Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate</p> <p>Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why</p>	Place value counters leading to column addition	<p>Apply this Y3 strategy to THTO</p> 	<p>Apply this Y3 strategy to THTO</p> 	<p>Apply this strategy to adding four digit numbers</p> $\begin{array}{r} 243 \\ +368 \\ \hline 611 \\ \hline 1\ 1 \end{array}$
	Add and subtract fractions with the same denominator beyond a whole	Part whole models leading to addition of numerators		$\frac{6}{8} + \frac{5}{8} =$  <p>Draw diagrams to add fractions beyond one with the same denominator</p>	$\frac{6}{8} + \frac{5}{8} = \frac{11}{8}$ <p>Add the numerators together to create a proper or improper fraction. The denominator stays the same.</p>

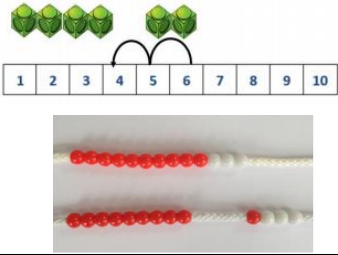
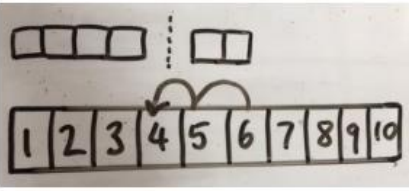
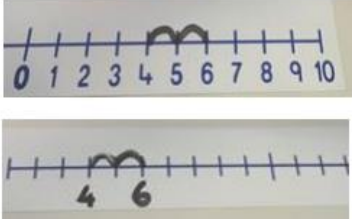
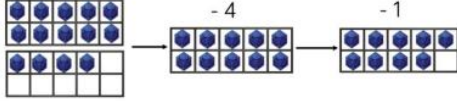
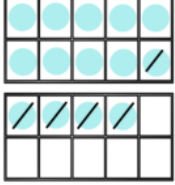
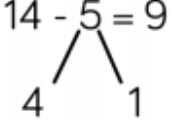
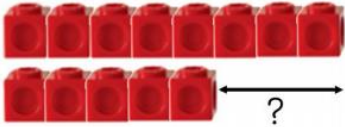
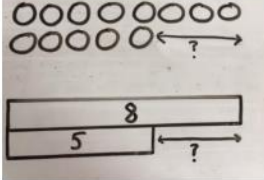
Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Written/Mental Representations
5	<p>Add and subtract numbers mentally with increasingly large numbers</p> <p>Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)</p> <p>Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</p>	Place value counters leading to column addition	<p>Apply this strategy to more than four digits, including decimals (tenths hundredths)</p> 	<p>Apply this strategy to more than four digits, including decimals (tenths hundredths)</p> 	<p>Apply this strategy to more than four digits, including decimals (tenths hundredths)</p> 
	Add and subtract fractions with the same denominator and multiples of the same number	Part whole models leading to addition	<p>Use equal sized lego pieces to add fractions within and beyond one whole.</p> <p>For fractions with denominators which are multiples of the same number, children should use their knowledge of equivalent fractions to ensure common denominators before using this method.</p> 	<p>Draw diagrams to add fractions beyond one with the same denominator.</p> <p>For fractions with denominators which are multiples of the same number, children should use their knowledge of equivalent fractions to ensure common denominators before using this method.</p> 	<p>Add the numerators together to create an improper fraction and convert to a mixed number (see below). The denominator stays the same.</p> <p>For fractions with denominators which are multiples of the same number, children should use their knowledge of equivalent fractions to ensure common denominators before using this method.</p> 
	Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements >1 as a mixed number (e.g. $\frac{7}{3} + \frac{4}{3} = \frac{11}{3} = 3\frac{2}{3}$)	Converting mixed numbers to improper fractions	<p>Step one: Convert any mixed numbers to improper fractions using physical bar models, cubes or lego</p> 	<p>Step one: Convert any mixed numbers to improper fractions by drawing diagrams</p> 	<p>Step one: Convert any mixed numbers to improper fractions by multiplying the whole by the denominator and adding the numerator.</p> 

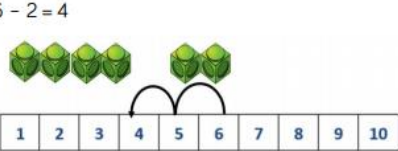
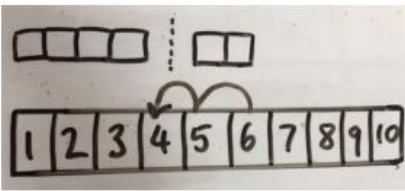
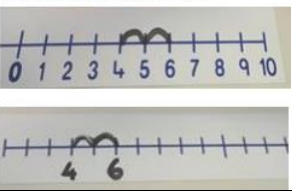
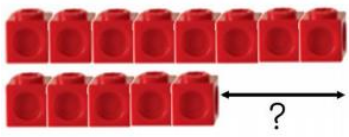
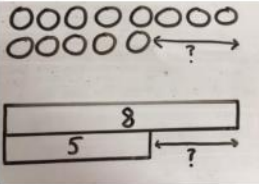
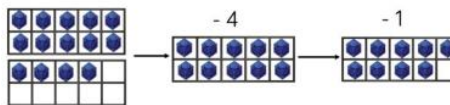

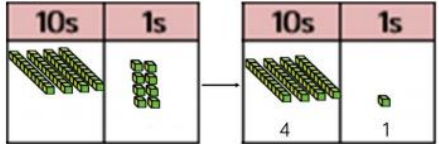
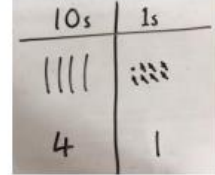
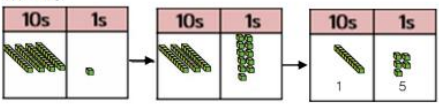
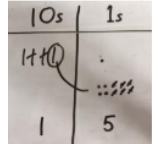
Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Written/Mental Representations
6	<p>Perform mental calculations, including with mixed operations and large numbers</p> <p>Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</p>	Place value counters leading to column addition	<p>Apply this Y3 strategy to more than four digits</p> 	<p>Apply this Y3 strategy to more than four digits</p> 	<p>Apply this strategy to adding more than four digit numbers</p> $\begin{array}{r} 243 \\ +368 \\ \hline 611 \\ \hline 1 \quad 1 \end{array}$ 
	<p>Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions</p>	Part whole models leading to addition	<p>Use equal sized lego pieces to add fractions within and beyond one whole.</p> <p>For fractions with denominators which are multiples of the same number, children should use their knowledge of equivalent fractions to ensure common denominators before using this method.</p> 	<p>Draw diagrams to add fractions beyond one with the same denominator.</p> <p>For fractions with denominators which are multiples of the same number, children should use their knowledge of equivalent fractions to ensure common denominators before using this method.</p> $\frac{6}{8} + \frac{5}{8} =$ 	$\frac{6}{8} + \frac{5}{8} = \frac{11}{8} = 1\frac{3}{8}$ <p>Add the numerators together to create an improper fraction and convert to a mixed number (see Y5). The denominator stays the same.</p> <p>For fractions with denominators which are multiples of the same number, children should use their knowledge of equivalent fractions to ensure common denominators before using this method.</p>

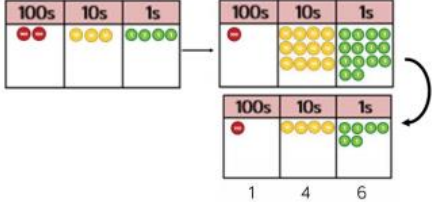
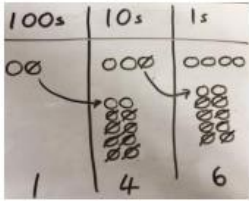

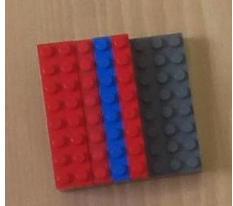
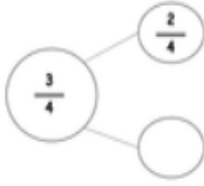
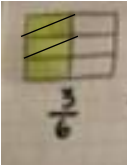
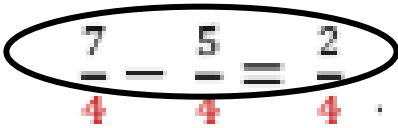
Subtraction Strategies

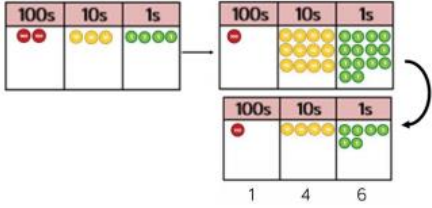
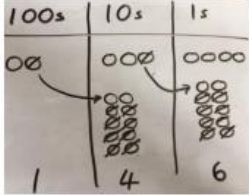

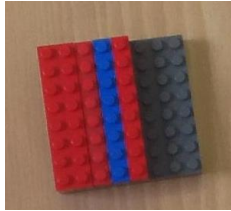
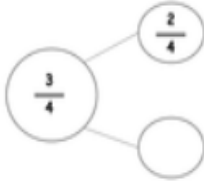
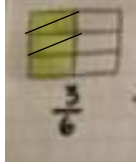
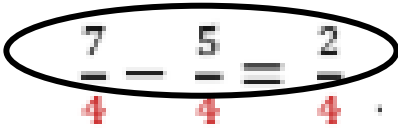
Key language: take away, less than, the difference, subtract, minus, fewer, decrease.

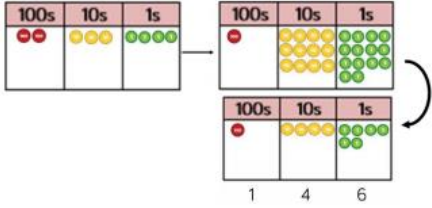
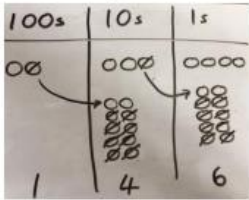

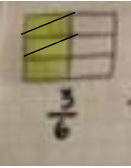



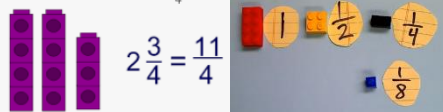


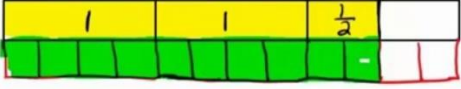
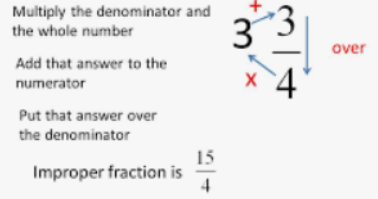


Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Written/Mental Representations
R	<p>Uses the language of 'more' and 'fewer' to compare two sets of objects.</p> <p>Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.</p>	<p>Taking away ones/ part whole model</p>	<p>Physically taking away and removing objects from a whole (ten frames, Numicon, cubes and other items such as beanbags could be used).</p> <p>$4 - 3 = 1$</p> 	<p>Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used.</p> 	<p>$4 - 3 =$</p> <p> $= 4 - 3$</p>  
		<p>Counting back in ones using a number line</p>	<p>Counting back (using number lines or number tracks) children start with 6 and count back 2.</p> <p>$6 - 2 = 4$</p> 	<p>Children to represent what they see pictorially e.g.</p> 	<p>Children to represent the calculation on a number line or number track and show their jumps. Encourage children to use an empty number line</p> 

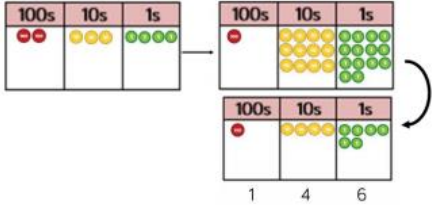
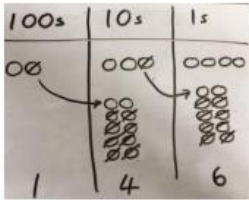
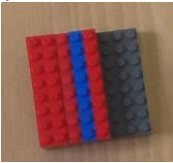
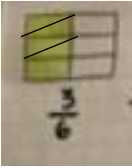

Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Written/Mental Representations
1	<p>Represent and use number bonds and related subtraction facts within 20</p> <p>Add and subtract one-digit and two-digit numbers to 20, including zero</p> <p>Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs</p> <p>Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = * - 9$</p>	<p>Counting back in ones using a number line</p>	<p>Counting back (using number lines or number tracks) children start with 6 and count back 2.</p> <p>$6 - 2 = 4$</p> 	<p>Children to represent what they see pictorially e.g.</p> 	<p>Children to represent the calculation on a number line or number track and show their jumps. Encourage children to use an empty number line</p> 
		<p>Partitioning to bridge 10</p>	<p>Making 10 using ten frames.</p> <p>$14 - 5$</p> 	<p>Children to present the ten frame pictorially and discuss what they did to make 10.</p> 	<p>Children to show how they can make 10 by partitioning the subtrahend.</p> $14 - 5 = 9$  <p>$14 - 4 = 10$ $10 - 1 = 9$</p>
		<p>Part-whole connections: finding the difference</p>	<p>Finding the difference (using cubes, Numicon or Cuisenaire rods, other objects can also be used).</p> <p>Calculate the difference between 8 and 5.</p> 	<p>Children to draw the cubes/other concrete objects which they have used or use the bar model to illustrate what they need to calculate.</p> 	<p>Find the difference between 8 and 5.</p> <p>$8 - 5$, the difference is <input type="text"/></p> <p>Children to explore why $9 - 6 = 8 - 5 = 7 - 4$ have the same difference.</p>

Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Written/Mental Representations
2	<p>Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100</p> <p>Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:</p> <ul style="list-style-type: none"> * a two-digit number and ones * a two-digit number and tens * two two-digit numbers * adding three one-digit numbers <p>Solve problems with addition and subtraction:</p> <ul style="list-style-type: none"> * using concrete objects and pictorial representations, including those involving numbers, quantities and measures * applying their increasing knowledge of mental and written methods 	<p>Counting back in ones using a number line</p>	<p>Counting back (using number lines or number tracks) children start with 6 and count back 2.</p> <p>$6 - 2 = 4$</p> 	<p>Children to represent what they see pictorially e.g.</p> 	<p>Children to represent the calculation on a number line or number track and show their jumps. Encourage children to use an empty number line</p> 
		<p>Part-whole connections: finding the difference</p>	<p>Finding the difference (using cubes, Numicon or Cuisenaire rods, other objects can also be used).</p> <p>Calculate the difference between 8 and 5.</p> 	<p>Children to draw the cubes/other concrete objects which they have used or use the bar model to illustrate what they need to calculate.</p> 	<p>Find the difference between 8 and 5.</p> <p>$8 - 5$, the difference is <input type="text"/></p> <p>Children to explore why $9 - 6 = 8 - 5 = 7 - 4$ have the same difference.</p>
		<p>Partitioning to bridge 10</p>	<p>Making 10 using ten frames.</p> <p>$14 - 5$</p> 	<p>Children to present the ten frame pictorially and discuss what they did to make 10.</p> 	<p>Children to show how they can make 10 by partitioning the subtrahend.</p> <p>$14 - 5 = 9$</p> <p>4 1</p> <p>$14 - 4 = 10$ $10 - 1 = 9$</p>
		<p>Use of base 10 with and without exchange</p>	<p>Column method using base 10.</p> <p>$48 - 7$</p> 	<p>Children to represent the base 10 pictorially.</p> 	<p>Children calculate $48 - 7$ by recognising that they can subtract in ones without needing to exchange.</p> <p>$8 - 7 = 1$ $48 - 7 = 41$</p>
	<p>Column method using base 10 and having to exchange.</p> <p>$41 - 26$</p> 	<p>Represent the base 10 pictorially, remembering to show the exchange.</p> 	<p>Children can calculate $41 - 26$ by recognising that they can exchange a ten for ones to help their subtraction</p>		

Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Written/Mental Representations
3	<p>Add and subtract numbers mentally, including:</p> <ul style="list-style-type: none"> * a three-digit number and ones * a three-digit number and tens * a three-digit number and hundreds <p>Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction</p> <p>Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction</p>	<p>Column method with regrouping</p>	<p>Column method using place value counters.</p> <p>234 - 88</p> 	<p>Represent the place value counters pictorially; remembering to show what has been exchanged.</p> 	<p>Formal column method. Children must understand what has happened when they have crossed out digits.</p> $\begin{array}{r} ^2 ^1 \\ 234 \\ - 88 \\ \hline 6 \end{array}$
	<p>Add and subtract fractions with the same denominator within one whole (e.g. $\frac{3}{7} + \frac{2}{7} = \frac{5}{7}$)</p>	<p>Part whole models leading to subtraction of numerators</p>	 $\frac{10}{10} - \frac{2}{10} = \frac{8}{10}$  $\frac{10}{10} - \frac{2}{10} = \frac{8}{10}$	 $\frac{3}{4} - \frac{2}{4} =$ <p>Children draw part-whole models to support subtraction of numerators</p>  $\frac{3}{6} - \frac{2}{6} = \frac{1}{6}$	 <p>Subtract the numerators: the denominator stays the same.</p>

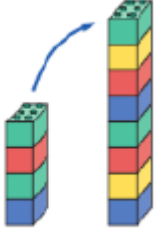

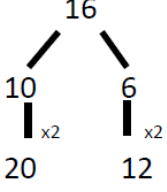
Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Written/Mental Representations
4	<p>Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate</p> <p>Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why</p>	<p>Column method with regrouping</p>	<p>Apply this method to four digit numbers</p> <p>Column method using place value counters. 234 - 88</p> 	<p>Apply this method to four digit numbers</p> <p>Represent the place value counters pictorially; remembering to show what has been exchanged.</p> 	<p>Apply this method to four digit numbers</p> <p>Formal column method. Children must understand what has happened when they have crossed out digits.</p> $\begin{array}{r} 234 \\ - 088 \\ \hline 146 \end{array}$
	<p>Add and subtract fractions with the same denominator</p>	<p>Part whole models leading to subtraction of numerators</p>	 $\frac{10}{10} - \frac{2}{10} = \frac{8}{10}$  $\frac{8}{8} - \frac{3}{8} = \frac{5}{8}$	 $\frac{3}{4} - \frac{2}{4} =$ <p>Children draw part-whole models to support subtraction of numerators</p>  $\frac{3}{6} - \frac{2}{6} = \frac{1}{6}$	 <p>Subtract the numerators: the denominator stays the same.</p>

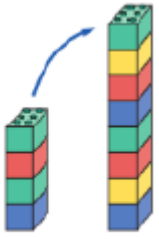

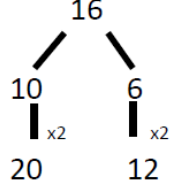
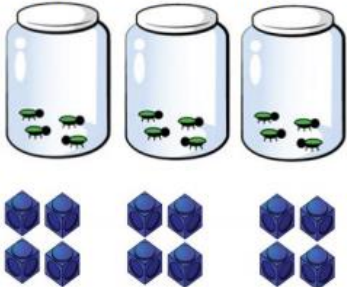
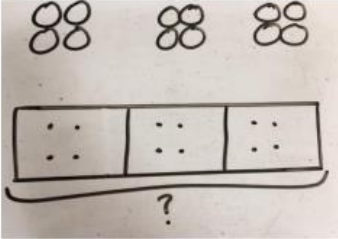
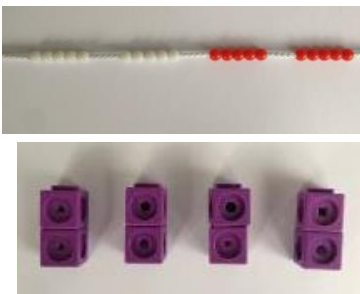
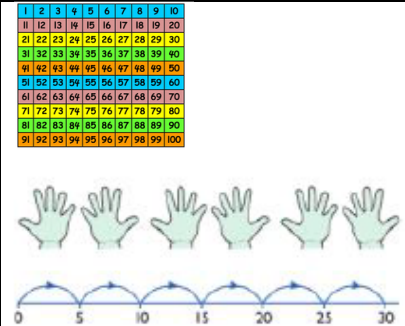
Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Written/Mental Representations								
5	<p>Add and subtract numbers mentally with increasingly large numbers</p> <p>Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)</p> <p>Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</p>	Column method with regrouping	<p>Apply this method to calculations using more than four digit numbers</p> <p>Column method using place value counters.</p> <p>234 - 88</p> 	<p>Apply this method to calculations using more than four digit numbers</p> <p>Represent the place value counters pictorially; remembering to show what has been exchanged.</p> 	<p>Apply this method to calculations using more than four digit numbers</p> <p>Formal column method. Children must understand what has happened when they have crossed out digits.</p> $\begin{array}{r} 234 \\ - 88 \\ \hline 146 \end{array}$								
	Add and subtract fractions with the same denominator and multiples of the same number	Part whole models leading to subtraction	 $\frac{3}{8} - \frac{3}{8} = \frac{5}{8}$ <p>Use part whole lego models to model subtracting fractions within and beyond one whole.</p> <p>For fractions with denominators which are multiples of the same number, children should use their knowledge of equivalent fractions to ensure common denominators before using this method.</p>	 $\frac{3}{6} - \frac{2}{6} = \frac{1}{6}$ <p>Draw diagrams to add fractions beyond one with the same denominator.</p> <p>For fractions with denominators which are multiples of the same number, children should use their knowledge of equivalent fractions to ensure common denominators before using this method.</p>	 <p>Subtract the numerators: the denominator stays the same.</p> <p>For fractions with denominators which are multiples of the same number, children should use their knowledge of equivalent fractions to ensure common denominators before using this method.</p>								
	Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements >1 as a mixed number (e.g. $\frac{11}{4} + \frac{4}{4} = \frac{15}{4} = 1\frac{1}{4}$)	Converting mixed numbers to improper fractions	<p>Step one: Convert any mixed numbers to improper fractions using physical bar models, cubes or lego</p> <table border="1" data-bbox="745 1209 1081 1353"> <thead> <tr> <th>Mixed Number</th> <th>Step 1 Draw the representation.</th> <th>Step 2 Divide it into equal parts.</th> <th>Step 3 Count the number of equal parts to find the numerator.</th> </tr> </thead> <tbody> <tr> <td>$2\frac{3}{4}$</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>  $2\frac{3}{4} = \frac{11}{4}$	Mixed Number	Step 1 Draw the representation.	Step 2 Divide it into equal parts.	Step 3 Count the number of equal parts to find the numerator.	$2\frac{3}{4}$				<p>Step one: Convert any mixed numbers to improper fractions by drawing diagrams</p> 	<p>Step one: Convert any mixed numbers to improper fractions by multiplying the whole by the denominator and adding the numerator.</p>  <p>Multiply the denominator and the whole number</p> <p>Add that answer to the numerator</p> <p>Put that answer over the denominator</p> <p>Improper fraction is $\frac{15}{4}$</p>
Mixed Number	Step 1 Draw the representation.	Step 2 Divide it into equal parts.	Step 3 Count the number of equal parts to find the numerator.										
$2\frac{3}{4}$													

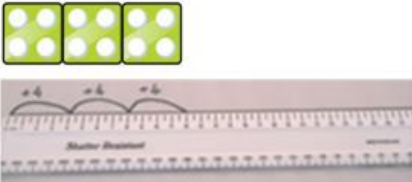
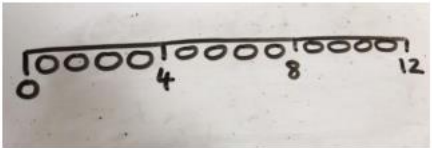
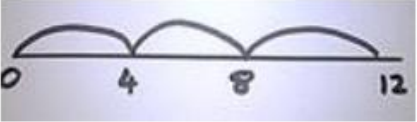
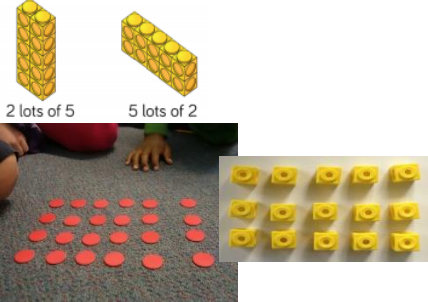
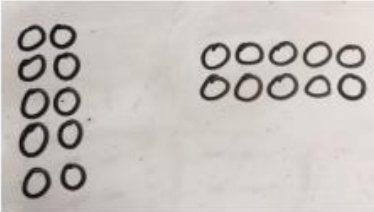
Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Written/Mental Representations
6	<p>Perform mental calculations, including with mixed operations and large numbers</p> <p>Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</p>	<p>Column method with regrouping</p>	<p>Apply this method to calculations using more than four digit numbers</p> <p>Column method using place value counters. 234 - 88</p> 	<p>Apply this method to calculations using more than four digit numbers</p> <p>Represent the place value counters pictorially; remembering to show what has been exchanged.</p> 	<p>Apply this method to calculations using more than four digit numbers</p> <hr/> <p>Formal column method. Children must understand what has happened when they have crossed out digits.</p> $\begin{array}{r} \overset{2}{2} \overset{1}{3} 4 \\ - 88 \\ \hline 6 \end{array}$
	<p>Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions</p>	<p>Part whole models leading to subtraction</p>	<p>*only if required/for differentiation</p>  $\frac{8}{8} - \frac{3}{8} = \frac{5}{8}$ <p>Use part whole lego models to model subtracting fractions within and beyond one whole. For fractions with denominators which are multiples of the same number, children should use their knowledge of equivalent fractions to ensure common denominators before using this method.</p>	<p>*only if required/for differentiation</p>  $\frac{3}{6} - \frac{2}{6} = \frac{1}{6}$ <p>Draw diagrams to add fractions beyond one with the same denominator. For fractions with denominators which are multiples of the same number, children should use their knowledge of equivalent fractions to ensure common denominators before using this method.</p>	 <p>Subtract the numerators: the denominator stays the same. For fractions with denominators which are multiples of the same number, children should use their knowledge of equivalent fractions to ensure common denominators before using this method.</p>

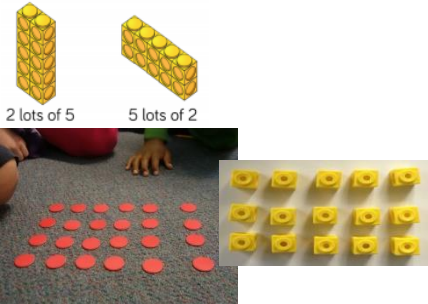
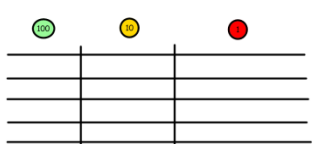
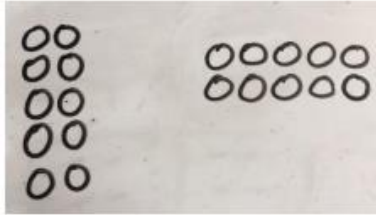
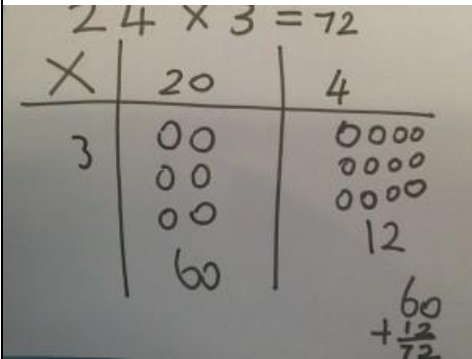
Multiplication Strategies

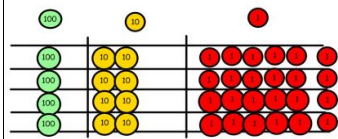
Key language: double, times, multiplied by, the product of, groups of, lots of, equal groups.

Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Mental/Written Representations
R	Solve problems, including doubling, halving and sharing.	Doubling	<p>Use practical activities to show how to double a number.</p>  <p>double 4 is 8 $4 \times 2 = 8$</p>	<p>Draw pictures to show how to double a number.</p> <p>Double 4 is 8</p> 	 <p>Partition a number and then double each part before recombining it back together.</p>

Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Mental/Written Representations
1	<p>Count in multiples of twos, fives and tens</p> <p>Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher</p>	<p>Doubling</p>	<p>Use practical activities to show how to double a number.</p>  <p>double 4 is 8 $4 \times 2 = 8$</p>	<p>Draw pictures to show how to double a number.</p> <p>Double 4 is 8</p> 	<p>Partition a number and then double each part before recombining it back together.</p> 
		<p>Repeated addition of equal groups</p>	<p>Repeated grouping/repeated addition 3×4 $4 + 4 + 4$ There are 3 equal groups, with 4 in each group.</p> 	<p>Children to represent the practical resources in a picture and use a bar model.</p> 	<p>$3 \times 4 = 12$</p> <p>$4 + 4 + 4 = 12$</p>
		<p>Counting in multiples: use cubes, Numicon and other objects in the classroom</p>			<p>Count in multiples of a number aloud.</p> <p>Write sequences with multiples of numbers.</p> <p>2, 4, 6, 8, 10</p> <p>5, 10, 15, 20, 25, 30</p>

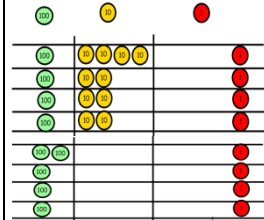
Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Mental/Written Representations
2	<p>Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers</p> <p>Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals (=) signs</p> <p>Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts</p>	<p>Using number lines to show repeated groups</p>	<p>Number lines to show repeated groups- 3×4</p>  <p>Cuisenaire rods can be used too.</p>	<p>Represent this pictorially alongside a number line e.g.:</p> 	<p>Abstract number line showing three jumps of four.</p> <p>$3 \times 4 = 12$</p> 
		<p>Arrays- showing commutative multiplication</p>	<p>Use arrays to illustrate commutativity counters and other objects can also be used. $2 \times 5 = 5 \times 2$</p>  <p>2 lots of 5 5 lots of 2</p>	<p>Children to represent the arrays pictorially.</p> 	<p>Children to be able to use an array to write a range of calculations e.g.</p> <p>$10 = 2 \times 5$ $5 \times 2 = 10$ $2 + 2 + 2 + 2 + 2 = 10$ $10 = 5 + 5$</p>

Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Mental/Written Representations																																										
3	<p>Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables</p> <p>Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods</p> <p>Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects</p>	<p>Arrays</p> <p>Grid Method</p>	<p>Use arrays to illustrate commutativity counters and other objects can also be used. $2 \times 5 = 5 \times 2$</p>  <p>Show the link with arrays to first introduce the grid method.</p> <table border="1" data-bbox="696 651 1021 767"> <tr> <td>x</td> <td>10</td> <td>3</td> </tr> <tr> <td>4</td> <td></td> <td></td> </tr> </table> <p>4 rows of 10 4 rows of 3</p> <p>Move on to using Base 10 to move towards a more compact method.</p> <table border="1" data-bbox="696 871 987 1018"> <tr> <td>x</td> <td>T</td> <td>U</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table> <p>4 rows of 13</p> <p>Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.</p>  <p>Calculations 4 x 126</p> <p>Fill each row with 126.</p>	x	10	3	4			x	T	U				<p>Children to represent the arrays pictorially.</p>  <p>Children can represent the work they have done with place value counters in a way that they understand.</p> <p>They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below.</p> 	<p>Children to be able to use an array to write a range of calculations e.g.</p> <p>$10 = 2 \times 5$ $5 \times 2 = 10$ $2 + 2 + 2 + 2 + 2 = 10$ $10 = 5 + 5$</p> <p>Start with multiplying by one digit numbers and showing the clear addition alongside the grid.</p> <table border="1" data-bbox="1765 639 1966 703"> <tr> <td>x</td> <td>30</td> <td>5</td> </tr> <tr> <td>7</td> <td>210</td> <td>35</td> </tr> </table> <p>$210 + 35 = 245$</p> <p>Moving forward, multiply by a 2 digit number showing the different rows within the grid method.</p> <table border="1" data-bbox="1720 879 2056 1198"> <tr> <td></td> <td>10</td> <td>8</td> </tr> <tr> <td>10</td> <td>100</td> <td>80</td> </tr> <tr> <td>3</td> <td>30</td> <td>24</td> </tr> </table> <table border="1" data-bbox="1720 1046 2056 1198"> <tr> <td>X</td> <td>1000</td> <td>300</td> <td>40</td> <td>2</td> </tr> <tr> <td>10</td> <td>10000</td> <td>3000</td> <td>400</td> <td>20</td> </tr> <tr> <td>8</td> <td>8000</td> <td>2400</td> <td>320</td> <td>16</td> </tr> </table>	x	30	5	7	210	35		10	8	10	100	80	3	30	24	X	1000	300	40	2	10	10000	3000	400	20	8	8000	2400	320	16
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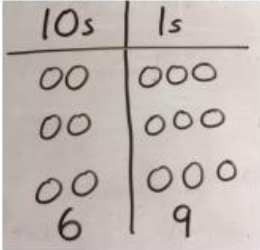
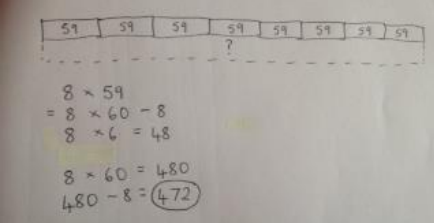
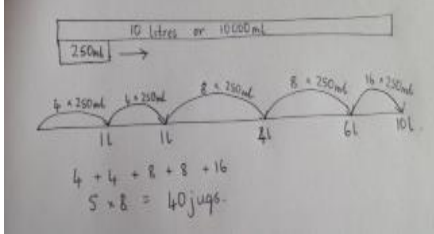


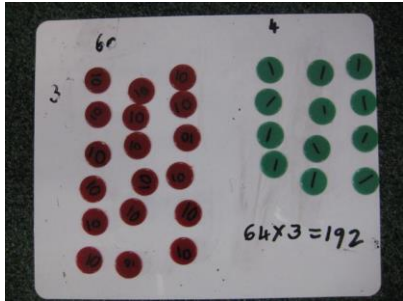
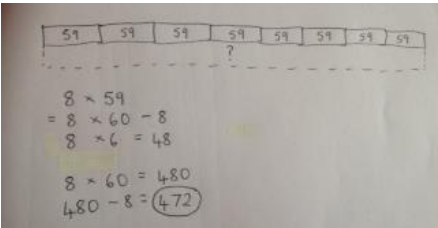
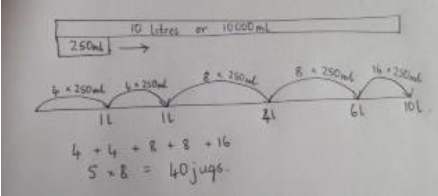
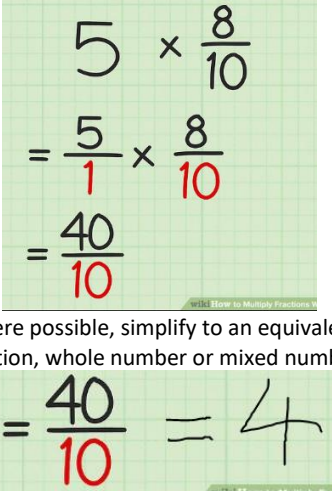
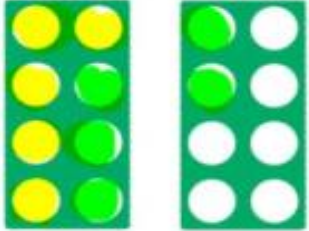
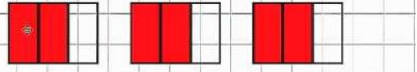

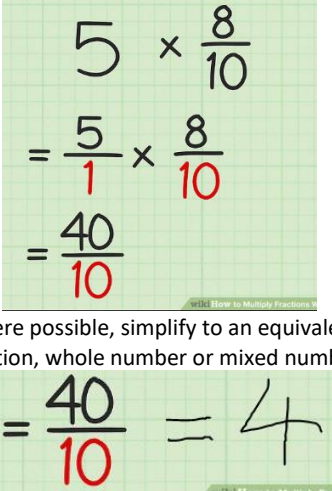
Calculations
4 x 126

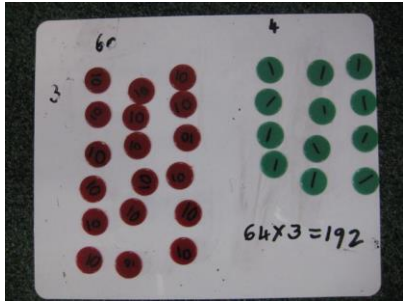
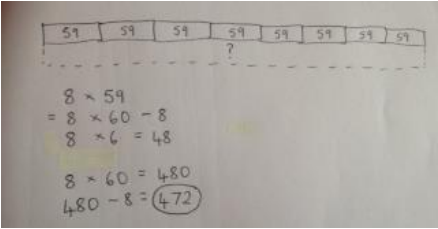
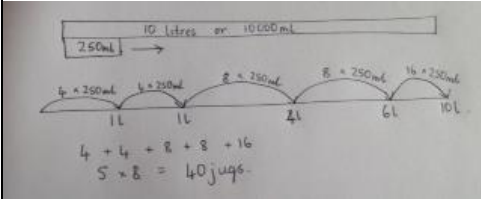
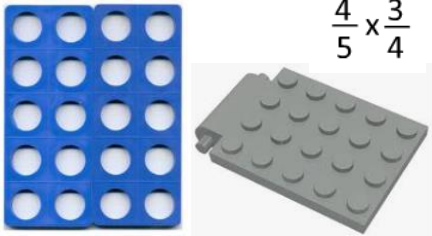
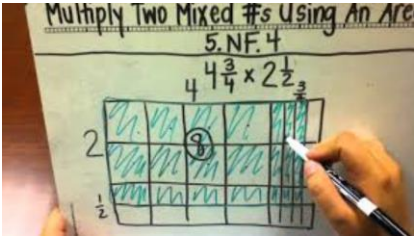
Add up each column, starting with the ones making any exchanges needed.



Then you have your answer.

Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Mental/Written Representations
4	<p>Recall multiplication and division facts for multiplication tables up to 12×12</p> <p>Use place value, known and derived facts to multiply and divide mentally, including:</p> <ul style="list-style-type: none"> *multiplying by 0 and 1; *dividing by 1; *multiplying together three numbers <p>Recognise and use factor pairs and commutativity in mental calculations</p> <p>Multiply two -digit and three -digit numbers by a one -digit number using formal written layout</p> <p>Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects</p>	<p>Column multiplication introduced with place value counters</p>	<p>Formal column method with place value counters (base 10 can also be used) 3×23</p> 	<p>Children to represent the counters pictorially.</p>  <p>Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.</p>  <p>8×59 $= 8 \times 60 - 8$ $8 \times 6 = 48$ $8 \times 60 = 480$ $480 - 8 = 472$</p> 	<p>Children record what it is they're doing to show understanding</p> $3 \times 23 \quad 3 \times 20 = 60$ $\quad \quad \quad 3 \times 3 = 9$ $20 \quad 3 \quad 60 + 9 = 69$ $\begin{array}{r} 23 \\ \times 3 \\ \hline 69 \end{array}$

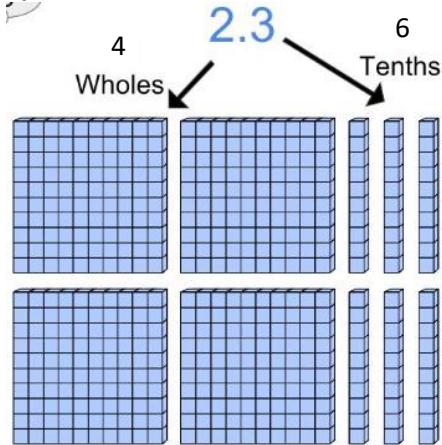
Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Mental/Written Representations
5	<p>Multiply and divide numbers mentally drawing upon known facts</p> <p>Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000</p> <p>Multiply numbers up to 4 digits by a one - or two - digit number using a formal written method, including long multiplication for two - digit numbers</p> <p>Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign</p>	<p>Column multiplication (concrete and pictorial if nec.)</p>	<p>Children can continue to be supported by place value counters at the stage of multiplication.</p>  <p>It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.</p>	 <p>Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.</p> 	<p>Start with expanded multiplication, reminding the children about lining up their numbers clearly in columns. If it helps, children can write out what they are solving next to their answer.</p> $\begin{array}{r} 32 \\ \times 24 \\ \hline 128 \\ 640 \\ \hline 768 \end{array}$ <p>This moves to the more compact method.</p> $\begin{array}{r} 32 \\ \times 24 \\ \hline 128 \\ 640 \\ \hline 768 \end{array}$ <p>Convert the whole number to a fraction (x over 1). Multiply the numerators together, then the denominators.</p>  <p>Where possible, simplify to an equivalent fraction, whole number or mixed number</p>
	<p>Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams</p>	<p>Repeated addition of fractions, leading to abstract multiplication</p>	<p>$\frac{5}{8} \times 2 =$</p>  <p>Children use numicon to carry out repeated addition of fractions. Convert to mixed number fractions using numicon to support.</p>	<p>Children draw bar models to show repeated addition of fractions. Convert to mixed number fractions as shown left, and in 'addition strategies' section.</p> <p>$3 \times \frac{2}{3} =$</p>  <p>$\frac{1}{6} \times 3 = \frac{3}{6}$</p>  <p>$\frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{3}{6}$</p>	<p>Convert the whole number to a fraction (x over 1). Multiply the numerators together, then the denominators.</p>  <p>Where possible, simplify to an equivalent fraction, whole number or mixed number</p>

Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Mental/Written Representations
6	<p>Perform mental calculations, including with mixed operations and large numbers</p> <p>Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication</p> <p>Solve problems involving addition, subtraction, multiplication and division</p>	<p>Column multiplication (concrete and pictorial if nec.)</p>	<p>Children can continue to be supported by place value counters at the stage of multiplication.</p>  <p>It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.</p>	<p>Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.</p>  	<p>Start with expanded multiplication, reminding the children about lining up their numbers clearly in columns. If it helps, children can write out what they are solving next to their answer.</p> $\begin{array}{r} 32 \\ \times 24 \\ \hline 128 \\ 640 \\ \hline 768 \end{array}$ <p>This moves to the more compact method.</p> $\begin{array}{r} 32 \\ \\ \times 24 \\ \hline 128 \\ 640 \\ \hline 768 \end{array}$
	<p>Multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$)</p>	<p>Area models leading to abstract multiplication</p>	<p>Use practical representations to create area models. Horizontally block 4 out of 5 to represent four fifths. Vertically block 3 out of 4 to show three quarters. Then use the diagram to find the product – the total number of spaces is the denominator, the shaded number of spaces is the numerator.</p>  <p>This method can also be used for mixed numbers.</p>	<p>Draw or shade area models. Horizontally shade 4 out of 5 to represent four fifths. Vertically shade 3 out of 4 to show three quarters. Then use the diagram to find the product – the total number of spaces is the denominator, the shaded number of spaces is the numerator. The diagram above shows 12/20. This method can also be used for mixed numbers as below:</p> 	<p>Multiply the numerators together, then multiply the denominators.</p> $\frac{2}{5} \times \frac{3}{4} = \frac{6}{20}$ <p>Multiply the denominators</p> $\frac{2}{5} \times \frac{3}{4} = \frac{6}{20}$ <p>Reduce the fraction if necessary</p> $\frac{6}{20} = \frac{3}{10}$ <p>For mixed numbers:</p> $1\frac{1}{2} \times 2\frac{1}{5} = 3\frac{3}{10}$ $\frac{3}{2} \times \frac{11}{5} = \frac{33}{10}$ <p>Do the multiplication as Improper Fractions</p>

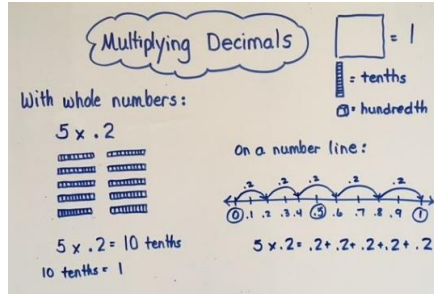
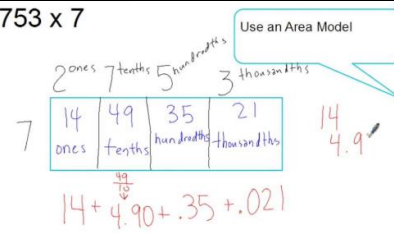
Multiply one-digit numbers with up to two decimal places by whole numbers

Area models leading to column multiplication

Use base 10 to physically calculate 2.3×2 by:

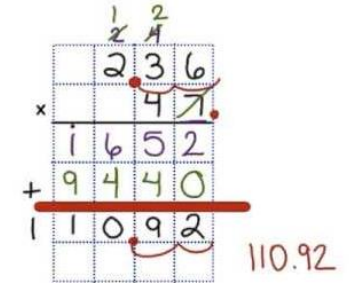


2.753×7



- Step 1: Line up the numbers as if there were no decimals
– DO NOT add "0" as place holders
- Step 2: multiply as if you had whole numbers
- Step 3: count the number of decimal places in each number
- Step 4: the total will be how many decimal places are in your answer

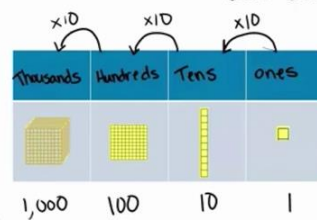
$2.36 \times 47 =$



Multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places

Base 10, leading to mental multiplication

How do the value of places relate to each other??



Use base 10 to physically multiply given numbers by 10, 100 and 1000.

Multiplying and Dividing by 10, 100 and 1000

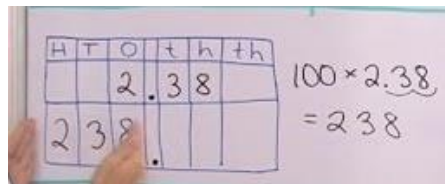
10 000	1000	100	10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$

Multiplying

- X 10 digits move LEFT 1 space
- X 100 digits move LEFT 2 spaces
- X 1000 digits move LEFT 3 spaces

Dividing

- ÷ 10 digits move RIGHT 1 space
- ÷ 100 digits move RIGHT 2 spaces
- ÷ 1000 digits move RIGHT 3 spaces



Mentally move the digits to the left by the same number as place holders in the multiple:

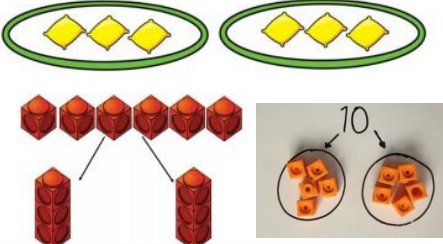
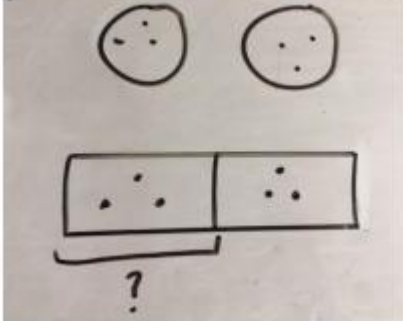
- X 10 digits move LEFT 1 space
- X 100 digits move LEFT 2 spaces
- X 1000 digits move LEFT 3 spaces

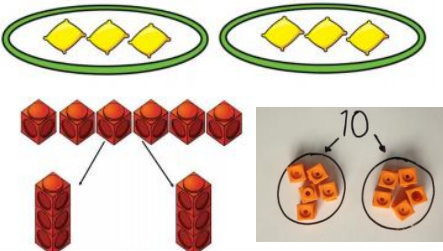
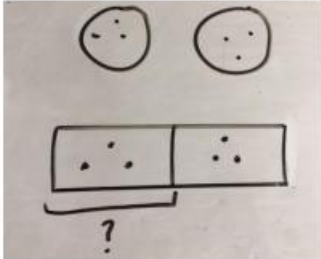
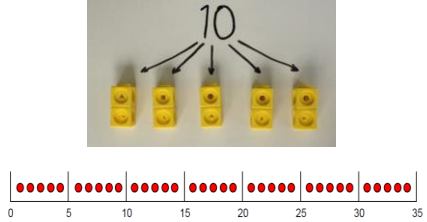
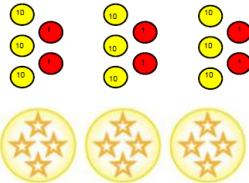
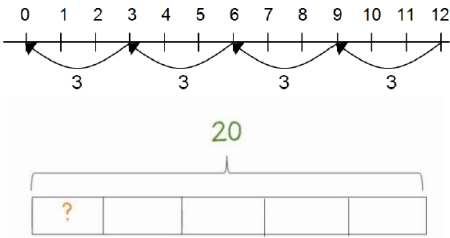


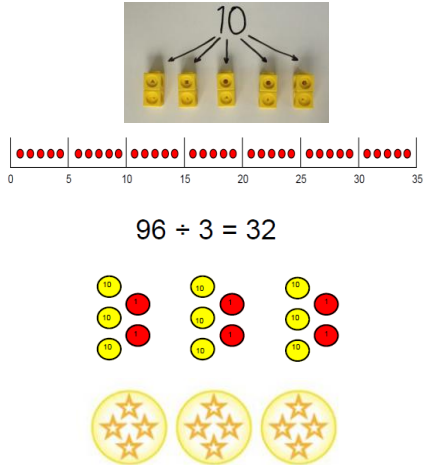
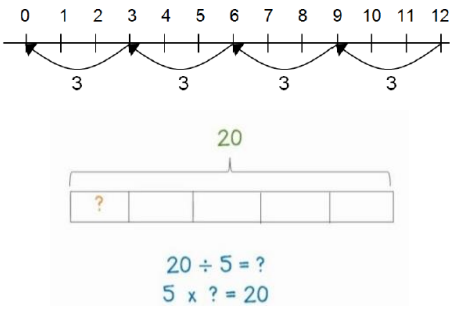
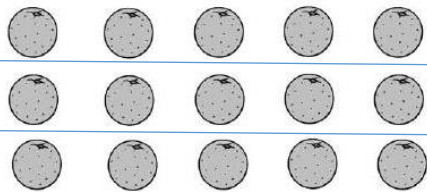
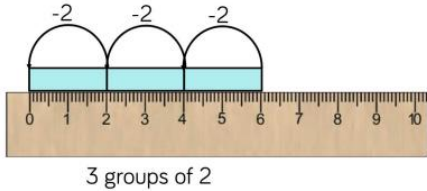
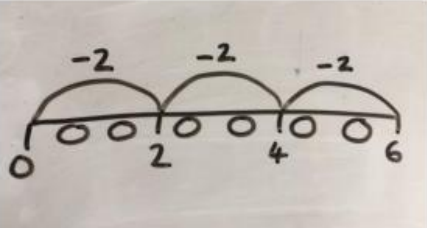
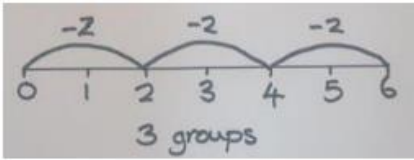
$3.4 \times 10 = 34$
 $3.4 \times 100 = 340$
 $3.4 \times 1000 = 3400$


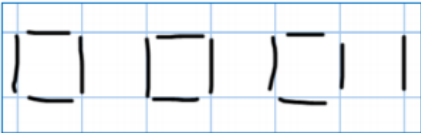
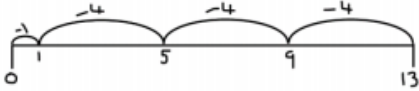
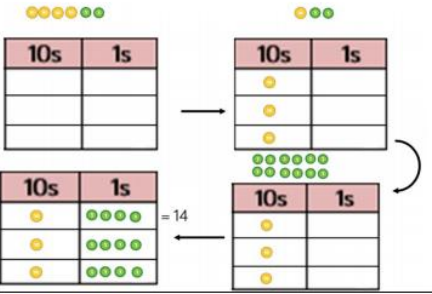
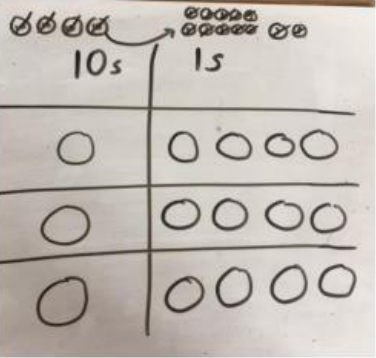
Division Strategies


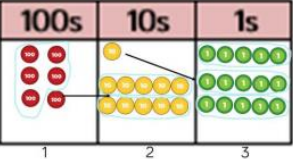
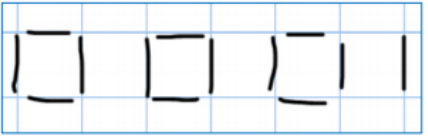
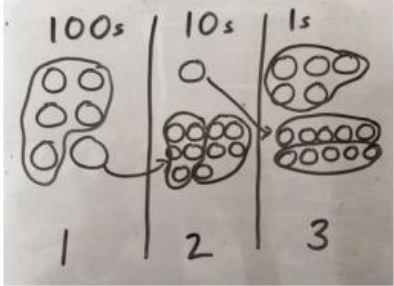
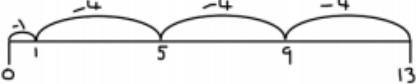
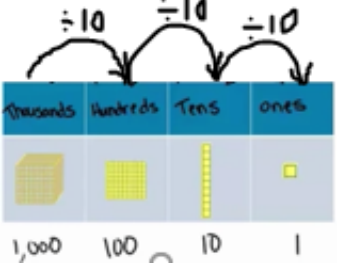

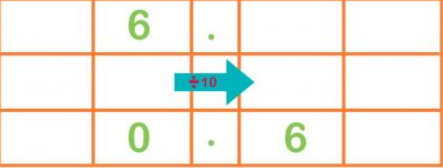

Key language: share, group, divide, divided by, half.

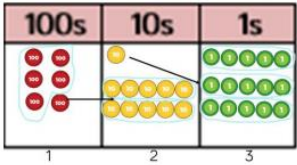
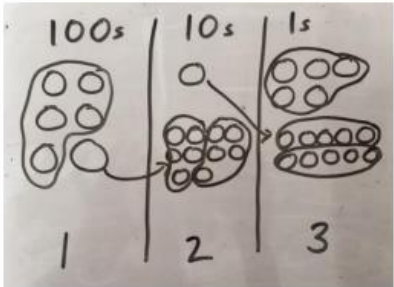
Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Mental/Written Representations		
R	Solve problems, including doubling, halving and sharing.	Sharing objects into groups	<p>Sharing using a range of objects. $6 \div 2$</p> 	<p>Represent the sharing pictorially.</p> 	<p>$6 \div 2 = 3$</p> <table border="1" data-bbox="1671 437 2054 497"> <tr> <td>3</td> <td>3</td> </tr> </table> <p>Children should also be encouraged to use their 2 times tables facts.</p>	3	3
3	3						

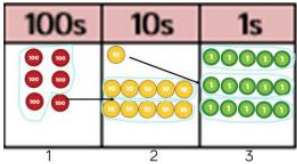

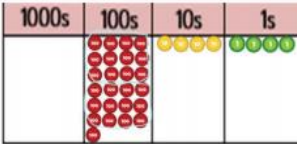
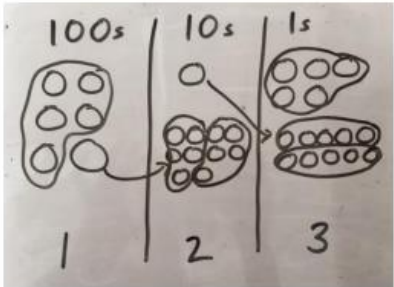
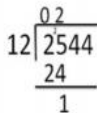
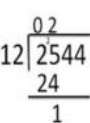
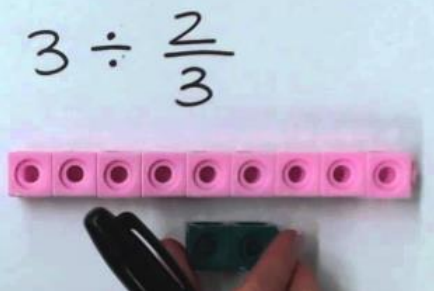
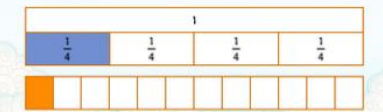
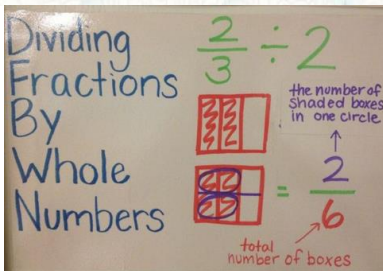
Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Mental/Written Representations		
1	<p>Count in multiples of twos, fives and tens</p> <p>Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher</p>	<p>Sharing objects into groups</p>	<p>Sharing using a range of objects. $6 \div 2$</p> 	<p>Represent the sharing pictorially.</p> 	<p>$6 \div 2 = 3$</p> <table border="1" data-bbox="1671 236 2051 296"> <tr> <td>3</td> <td>3</td> </tr> </table> <p>Children should also be encouraged to use their 2 times tables facts.</p>	3	3
		3	3				
<p>Division as grouping e.g. I have 12 sweets and put them in groups of 3, how many groups?</p>	<p>Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.</p>  <p>$96 \div 3 = 32$</p> 	<p>Use a number line to show jumps in groups. The number of jumps equals the number of groups.</p>  <p>$20 \div 5 = ?$ $5 \times ? = 20$</p> <p>Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.</p>	<p>$28 \div 7 = 4$</p> <p>Divide 28 into 7 groups. How many are in each group?</p>				

Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Mental/Written Representations
2	<p>Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers</p> <p>Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals (=) signs</p> <p>Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts</p>	<p>Division as grouping</p>	<p>Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.</p> 	<p>Use a number line to show jumps in groups. The number of jumps equals the number of groups.</p>  <p>Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.</p>	<p>$28 \div 7 = 4$</p> <p>Divide 28 into 7 groups. How many are in each group?</p>
		<p>Division within arrays- linked to multiplication</p>	<p>Link division to multiplication by creating an array and thinking about the number sentences that can be created.</p> <p>Eg $15 \div 3 = 5$ $5 \times 3 = 15$ $15 \div 5 = 3$ $3 \times 5 = 15$</p>	 <p>Draw an array and use lines to split the array into groups to make multiplication and division sentences.</p>	<p>Find the inverse of multiplication and division sentences by creating four linking number sentences.</p> <p>$7 \times 4 = 28$ $4 \times 7 = 28$ $28 \div 7 = 4$ $28 \div 4 = 7$</p>
		<p>Repeated subtraction</p> <p><i>*for GDS division with remainders see Y3</i></p>	<p>Repeated subtraction using Cuisenaire rods above a ruler. $6 - 2$</p> 	<p>Children to represent repeated subtraction pictorially.</p> 	<p>Abstract number line to represent the equal groups that have been subtracted.</p> 

Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Mental/Written Representations
3	<p>Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables</p> <p>Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods</p> <p>Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects</p>	<p>Division with a remainder</p> <p>(Also used for Y2 GDS)</p>	<p>2d + 1d with remainders using lollipop sticks. Cuisenaire rods, above a ruler can also be used. $13 \div 4$</p> <p>Use of lollipop sticks to form wholes- squares are made because we are dividing by 4.</p>  <p>There are 3 whole squares, with 1 left over.</p>	<p>Children to represent the lollipop sticks pictorially.</p>  <p>There are 3 whole squares, with 1 left over.</p>	<p>$13 \div 4 = 3$ remainder 1</p> <p>Children should be encouraged to use their times table facts; they could also represent repeated addition on a number line.</p> <p>'3 groups of 4, with 1 left over'</p> 
		<p>2digit divided by 1digit using base 10 or place value counters</p>	<p>Sharing using place value counters. $42 \div 3 = 14$</p> 	<p>Children to represent the place value counters pictorially.</p> 	<p>Children to be able to make sense of the place value counters and write calculations to show the process.</p> <p>$42 \div 3$ $42 = 30 + 12$ $30 \div 3 = 10$ $12 \div 3 = 4$ $10 + 4 = 14$</p>

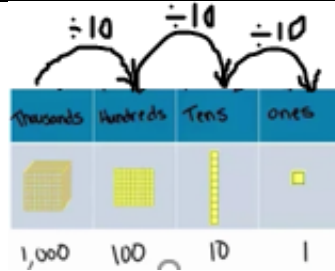
Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Mental/Written Representations																
4	<p>Recall multiplication and division facts for multiplication tables up to 12×12</p> <p>Use place value, known and derived facts to multiply and divide mentally, including: *multiplying by 0 and 1; *dividing by 1; *multiplying together three numbers</p> <p>Recognise and use factor pairs and commutativity in mental calculations</p> <p>Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects</p>	<p>Division with a remainder</p> <p>(Also used for Y2 GDS)</p> <p>Short division (up to 3 digits by 1 digit concrete and pictorial)</p>	<p>2d + 1d with remainders using lollipop sticks. Cuisenaire rods, above a ruler can also be used. $13 \div 4$</p> <p>Use of lollipop sticks to form wholes- squares are made because we are dividing by 4.</p>  <p>There are 3 whole squares, with 1 left over.</p> <p>Short division using place value counters to group. $615 \div 5$</p>  <ol style="list-style-type: none"> Make 615 with place value counters. How many groups of 5 hundreds can you make with 6 hundred counters? Exchange 1 hundred for 10 tens. How many groups of 5 tens can you make with 11 ten counters? Exchange 1 ten for 10 ones. How many groups of 5 ones can you make with 15 ones? 	<p>Children to represent the lollipop sticks pictorially.</p>  <p>There are 3 whole squares, with 1 left over.</p> <p>Represent the place value counters pictorially.</p> 	<p>$13 \div 4 = 3$ remainder 1</p> <p>Children should be encouraged to use their times table facts; they could also represent repeated addition on a number line.</p> <p>'3 groups of 4, with 1 left over'</p>  <p>Children to the calculation using the short division scaffold.</p> $\begin{array}{r} 123 \\ 5 \overline{) 615} \\ \underline{5} \\ 11 \\ \underline{10} \\ 15 \\ \underline{15} \\ 0 \end{array}$																
	<p>Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths</p>	<p>Base 10 leading to mental division</p>	 <p>Use base 10 to physically divide given numbers by 10, 100 and 1000.</p>	<p>Multiplying and Dividing by 10, 100 and 1000</p> <table border="1" data-bbox="1189 1058 1630 1169"> <tr> <td>10 000</td> <td>1000</td> <td>100</td> <td>10</td> <td>1</td> <td>$\frac{1}{10}$</td> <td>$\frac{1}{100}$</td> <td>$\frac{1}{1000}$</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <p>Multiplying X 10 digits move LEFT 1 space X 100 digits move LEFT 2 spaces X 1000 digits move LEFT 3 spaces</p> <p>Dividing ÷ 10 digits move RIGHT 1 space ÷ 100 digits move RIGHT 2 spaces ÷ 1000 digits move RIGHT 3 spaces</p>  	10 000	1000	100	10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$									<p>Mentally move the digits to the right by the same number as place holders in the divisor:</p> <p>Dividing</p> <p>÷ 10 digits move RIGHT 1 space ÷ 100 digits move RIGHT 2 spaces ÷ 1000 digits move RIGHT 3 spaces</p>  <p>$3400 \div 10 = 340$ $3400 \div 100 = 34$ $3400 \div 1000 = 3.4$</p>
10 000	1000	100	10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$														

Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Mental/Written Representations
5	<p>Multiply and divide numbers mentally drawing upon known facts</p> <p>Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000</p> <p>Divide numbers up to 4 digits by a one -digit number using the formal written method of short division and interpret remainders appropriately for the context</p> <p>Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign</p>	<p>Short division (up to 4 digits by a 1 digit number including remainders)</p>	<p>Short division using place value counters to group. $615 \div 5$</p>  <ol style="list-style-type: none"> 1. Make 615 with place value counters. 2. How many groups of 5 hundreds can you make with 6 hundred counters? 3. Exchange 1 hundred for 10 tens. 4. How many groups of 5 tens can you make with 11 ten counters? 5. Exchange 1 ten for 10 ones. 6. How many groups of 5 ones can you make with 15 ones? 	<p>Represent the place value counters pictorially.</p> 	<p>Children to the calculation using the short division scaffold.</p> $\begin{array}{r} 123 \\ 5 \overline{) 615} \\ \underline{5} \\ 11 \\ \underline{10} \\ 15 \\ \underline{15} \\ 0 \end{array}$ <p>*(up to 4 digits by a 1 digit number including remainders)</p>

Year Group	Relevant Objectives	Strategy	Concrete Representations	Pictorial Representations	Abstract/Mental/Written Representations
6	<p>Perform mental calculations, including with mixed operations and large numbers</p> <p>Divide numbers up to 4 - digits by a two -digit whole number using the formal written method of short division where appropriate for the context divide numbers up to 4 digits by a two -digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context</p> <p>Solve problems involving addition, subtraction, multiplication and division</p>	<p>Short division</p> <p>Long division with place value counters (up to 4 digits by a 2 digit number)</p>	<p>Short division using place value counters to group. $615 \div 5$</p>  <ol style="list-style-type: none"> 1. Make 615 with place value counters. 2. How many groups of 5 hundreds can you make with 6 hundred counters? 3. Exchange 1 hundred for 10 tens. 4. How many groups of 5 tens can you make with 11 ten counters? 5. Exchange 1 ten for 10 ones. 6. How many groups of 5 ones can you make with 15 ones? <p>Long division using place value counters $2544 \div 12$</p>  <p>We can't group 2 thousands into groups of 12 so will exchange them.</p>  <p>We can group 24 hundreds into groups of 12 which leaves with 1 hundred.</p>	<p>Represent the place value counters pictorially.</p>   	<p>Children to the calculation using the short division scaffold.</p> $5 \overline{) 615}$ <p>*(up to 4 digits by a 1 digit number including remainders)</p>
	<p>Divide proper fractions by whole numbers (e.g. $\frac{1}{2} \div 2 = \frac{1}{4}$)</p>	<p>Physical partitioning leading to 'flip and kiss'</p>	 <p>Use cubes to physically partition wholes into fractions.</p>	<p>Use bar models to demonstrate</p>  	<p>keep change flip</p> $\frac{3}{4} \div \frac{1}{6} = \frac{3}{4} \times \frac{6}{1} = \frac{18}{4} = 4 \frac{2}{4}$

Multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places

Base 10 leading to mental division



Use base 10 to physically divide given numbers by 10, 100 and 1000.

Multiplying and Dividing by 10, 100 and 1000

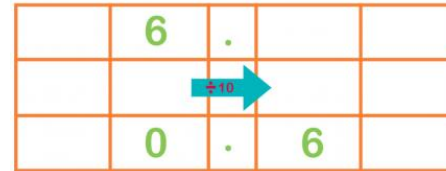
10 000	1000	100	10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$

Multiplying

X 10 digits move LEFT 1 space
X 100 digits move LEFT 2 spaces
X 1000 digits move LEFT 3 spaces

Dividing

÷ 10 digits move RIGHT 1 space
÷ 100 digits move RIGHT 2 spaces
÷ 1000 digits move RIGHT 3 spaces



Mentally move the digits to the right by the same number as place holders in the divisor:

Dividing

÷ 10 digits move RIGHT 1 space
÷ 100 digits move RIGHT 2 spaces
÷ 1000 digits move RIGHT 3 spaces



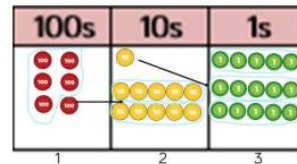
$3400 / 10 = 340$
 $3400 / 100 = 34$
 $3400 / 1000 = 3.4$

Use written division methods in cases where the answer has up to two decimal places

Short division with decimal numbers

Use the method below but change the headings to 10ths and 100ths accordingly

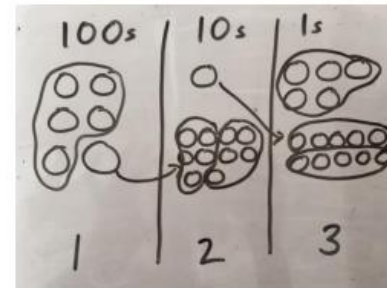
Short division using place value counters to group.
 $615 \div 5$



1. Make 615 with place value counters.
2. How many groups of 5 hundreds can you make with 6 hundred counters?
3. Exchange 1 hundred for 10 tens.
4. How many groups of 5 tens can you make with 11 ten counters?
5. Exchange 1 ten for 10 ones.
6. How many groups of 5 ones can you make with 15 ones?

Use the method below but change the headings to 10ths and 100ths accordingly

Represent the place value counters pictorially.



Children to the calculation using the short division scaffold.

$$\begin{array}{r} 123 \\ 5 \overline{) 615} \end{array}$$

*(write in decimal points accordingly instead of remainders)