

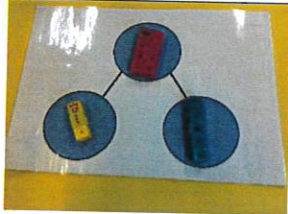
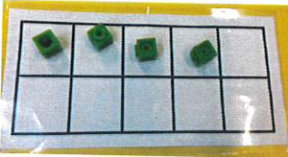

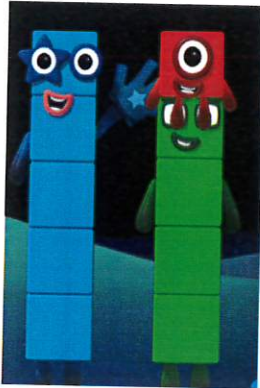
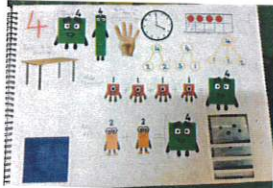


Section 2:

Progression in Calculation Strategies:

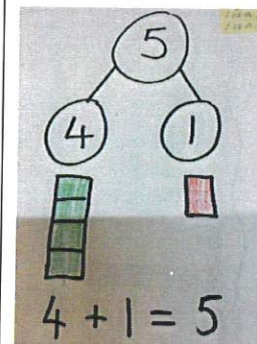
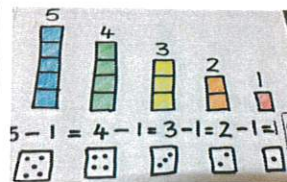
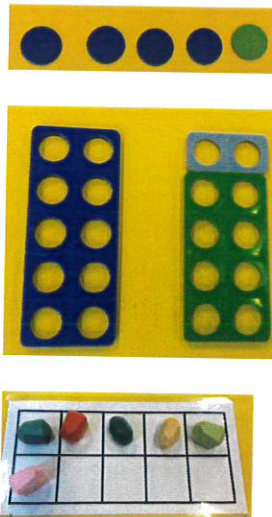
- Calculating in EYFS Page 1-6
- Addition Pages 7-12
- Subtraction Pages 13-12
- Multiplication Pages 21-28
- Division Page 29-36

Calculating in the EYFS at Water Street!

Number/Numerical patterns	The Reception Year	<p>Count objects, actions and sounds.</p> <p>Subitise.</p> <p>Link the number symbol (numeral) with its cardinal number value.</p> <p>Count beyond ten.</p> <p>Compare numbers.</p> <p>Understand the 'one more than/one less than' relationship between consecutive numbers.</p> <p>Explore the composition of numbers to 10.</p> <p>Automatically recall number bonds for numbers 0–10.</p> <p>Select, rotate and manipulate shapes in order to develop spatial reasoning skills.</p> <p>Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can.</p> <p>Continue, copy and create repeating patterns.</p> <p>Compare length, weight and capacity.</p>
	Early Learning Goal	<p>Number</p> <ul style="list-style-type: none"> - Have a deep understanding of number to 10, including the composition of each number; - Subitise (recognise quantities without counting) up to 5; - Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.
		<p>Numerical patterns</p> <ul style="list-style-type: none"> - Verbally count beyond 20, recognising the pattern of the counting system; - Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity; - Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

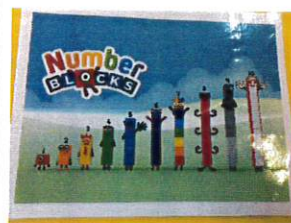
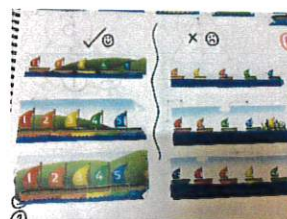
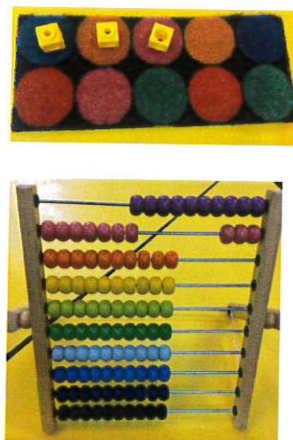
Examples of what this looks like in practice...			
Objective	CONCRETE	PICTORIAL	ABSTRACT
Have a deep understanding of number to 10, including the composition of each number	  	 	
Subitise (recognise quantities without counting) up to 5		By sight through practice	By sight through practice

Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts



Word problems, e.g. "Sam has 5 apples and he gives Ava 2 of his apples, how many apples does he have left?"

Verbally count beyond 20, recognising the pattern of the counting system;



Counting activities e.g.

Teacher: 1, 2,

Children: 3, 4,

Teacher: 5, 6...

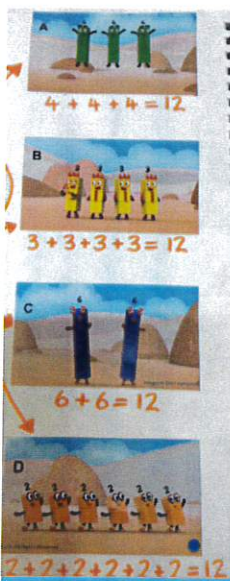
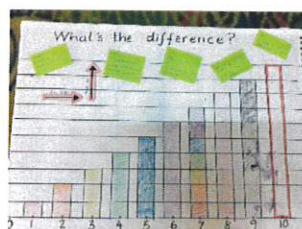
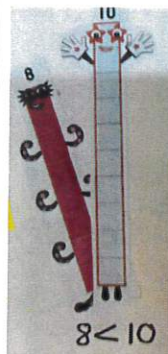
Odds and evens...

0, 1 (Whispered), 2 (outloud), 2 (W), 4 OL, 5 (W)...

Teacher: 22, 23, 24, 25..

Children: 26

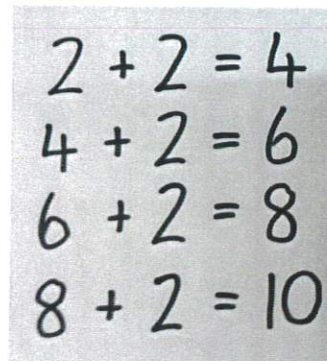
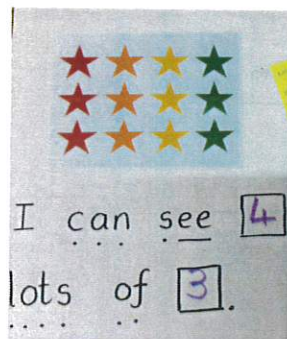
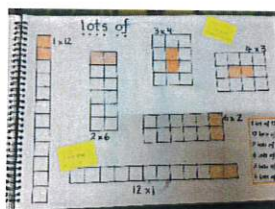
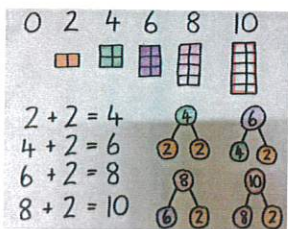
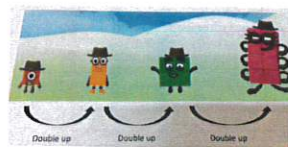
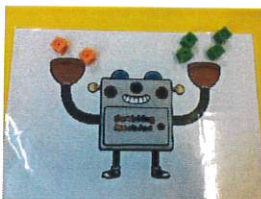
Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;



"One more than 4 is 5. It is the next number in the counting sequence."

"Can 6 hide behind 8? Yes because 8 is taller/bigger."

Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.



"2 4 6 8 10..."

"10 9 8 7 6 5 4 3 2 1 0."

"2 lots of 2 equals 4."

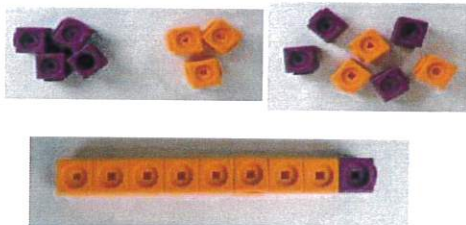
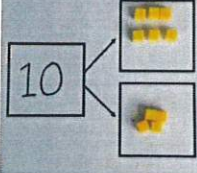
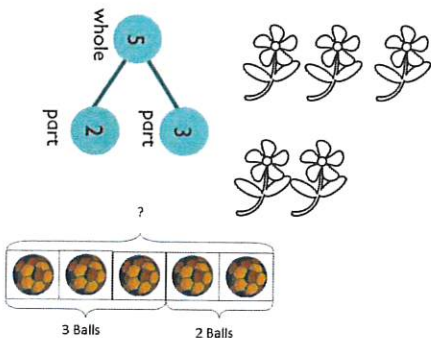
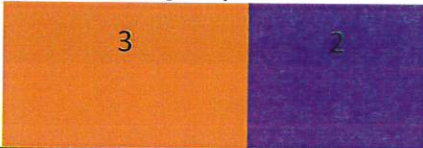
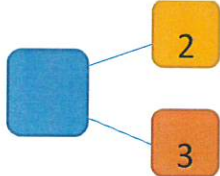
"If 2 children shared 6 cakes, they would each have 3."

How all this is covered term by term...		
Autumn	Spring	Summer
<p>Focus on numbers 1-5</p> <p>Recognise numerals</p> <p>Compare numbers</p> <p>More/less</p> <p>+ = symbols</p> <p>Counting forwards and back to 10+</p> <p>5 frame</p> <p>Circle/triangle/square</p> <p>1-5 O'clock</p> <p>Partition</p> <p>Recombine</p> <p>Subitise to 5</p> <p>Sequence numbers to 5</p> <p>1p, 2p, 5p</p> <p>Introduce part-part-whole</p> <p>Compare quantities – more/less/fewer</p> <p>One more/one less</p> <p>Taller/shorter</p>	<p>Focus on numbers 6-10</p> <p>Introduce 0 as the absence of something</p> <p>Number bonds to 5</p> <p>6-10 – meet numbers, equivalent representations, factors, partition and recombine within 6-10</p> <p>Doubling – 1 2 4 8</p> <p>Square numbers 4 and 9 (cubes)</p> <p>+/- $\frac{1}{2}$ (- symbol)</p> <p>10 as a two digit number</p> <p>Odd and even</p> <p>Counting forwards to 30 and back from 10.</p> <p>Count in tens/twos</p> <p>Tens frames</p> <p>Further develop part-part-whole</p>	<p>Embed numbers to 10 and then beyond to 20 (plus significant numbers e.g. 50 and 100)</p> <p>Greater/less than</p> <p>Combine and partition</p> <p>11-19 as 1 ten and a number of extra ones</p> <p>Arrays and rectangular numbers</p> <p>Rectangles</p> <p>Doubling and halving as inverse operations</p> <p>Sharing into equal groups</p> <p>Lots of - x</p> <p>Counting in 5s</p> <p>= as a balancing bridge</p> <p>Introduce 20 as two tens and no extra ones.</p> <p>Weight and capacity</p> <p>Time 1-12 O'clock</p> <p>Money to 10p</p> <p>Difference</p>


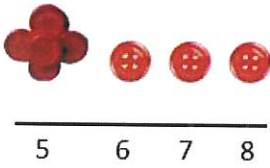
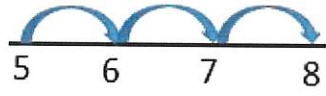
Calculation Guidance: Addition


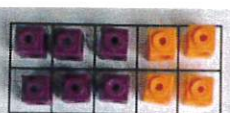
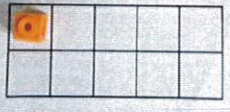
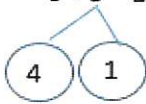

Year 1: End of Year Objective:

- Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs
- Represent and use number bonds and related subtraction facts within 20
- Add and subtract one-digit and two-digit numbers to 20, including zero (*using concrete objects and pictorial representations*)

	Objective	Concrete	Pictorial	Abstract
Year 1	Number bonds of 5, 6, 7, 8, 9 and 10	 <p>Use cubes to add two numbers together as a group or in a bar.</p>  <p>Combining two parts to make a whole. Part, Part whole model</p>	 <p>Use pictures to add two numbers together as a group or in a bar.</p> 	$2 + 3 = 5$ $3 + 2 = 5$ $5 = 3 + 2$ $5 = 2 + 3$  <p>Use the part-part whole diagram to move into the abstract</p>

Calculation Guidance: Addition

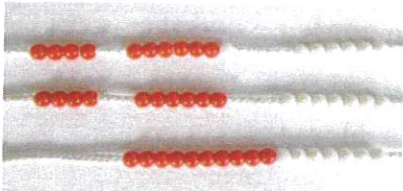
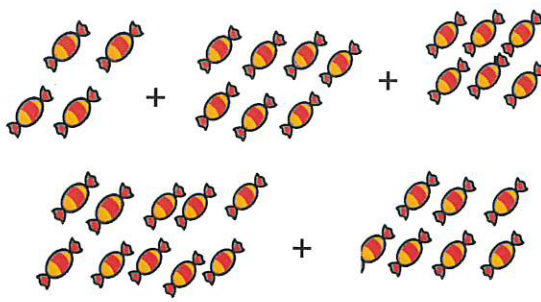
Year 1	Starting with the biggest number and counting on	 <p>Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.</p> 	<p>Use a number line to count on in ones.</p> $5 + 3 = 8$ 	$5 + 3 = 8$
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	Objective	Concrete	Pictorial	Abstract
Year 1	Regrouping to make 10	 <p>Bead string and ten frame</p>  <p>$6 + 5 = 11$</p>  <p>Start with the bigger number and use the smaller number to make 10</p>	<p>$6 + 5 = 11$</p>  <p>$6 + 4 = 10$</p> <p>$10 + 1 = 11$</p> 	$6 + 5 = 11$

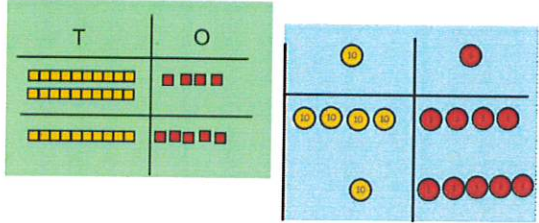
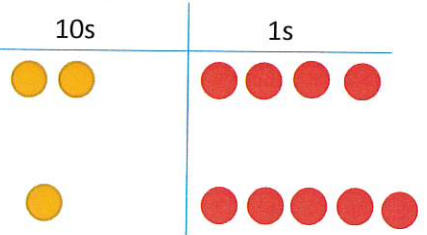
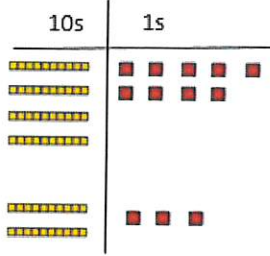
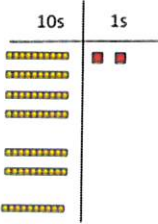
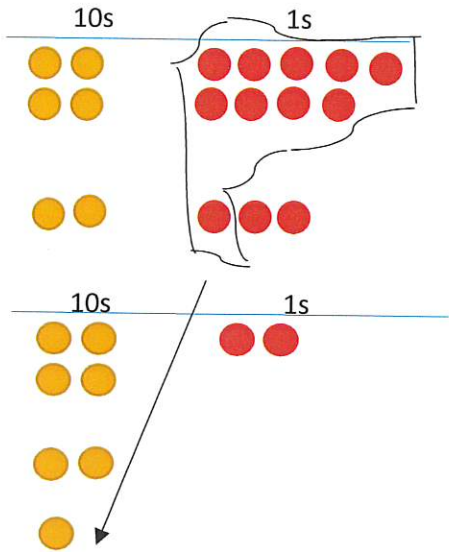
Calculation Guidance: Addition

Year 2- End of Year Objective:

- Add numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers; three one-digit numbers.

		Concrete	Pictorial	Abstract
Year 2	Adding 3 single digit numbers	<p>$4 + 7 + 6 = 17$ Put 4 and 6 together to make 10. Add on 7.</p>  <p>Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.</p>	 <p>Add together three groups of picture to recombine the</p>	$\begin{array}{r} \textcircled{4} + 7 + \textcircled{6} = \boxed{10} + \boxed{7} \\ \quad \quad \quad \underbrace{\quad\quad}_{10} \\ \quad \quad \quad = \boxed{17} \end{array}$ <p>Combine the two numbers that make 10 and then add on the remainder.</p>

Calculation Guidance: Addition

	Objective	Concrete	Pictorial	Abstract
Year 2	Column method without regrouping	<p>Add together the ones first, then add the tens. Use the Base 10 blocks first before moving onto place value counters.</p> <p>$24 + 15 =$</p>  <p>$44 + 15 =$</p>	<p>After physically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.</p> 	<p>$24 + 15 = 39$</p> $\begin{array}{r} 24 \\ + 15 \\ \hline 39 \end{array}$
	Column method with regrouping	<p>Make both numbers on a place value grid.</p>  <p>Add up the units and exchange 10 ones for 1 ten</p>  <p>Add up the units and exchange f</p>	<p>Using place value counters, children can draw the counters to help them to solve additions.</p> 	<p>$40 + 9$ $20 + 3$ $60 + 12 = 72$</p> $\begin{array}{r} 49 \\ + 23 \\ \hline 72 \\ 1 \end{array}$

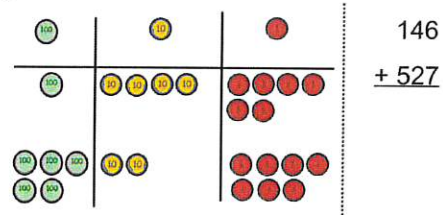
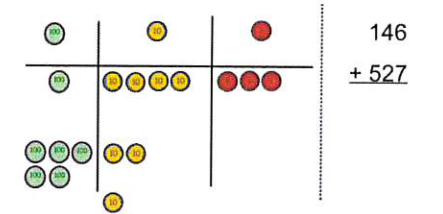
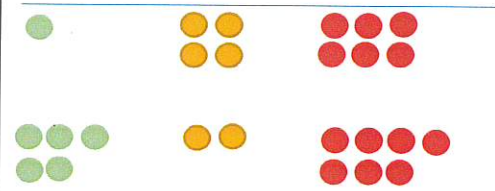
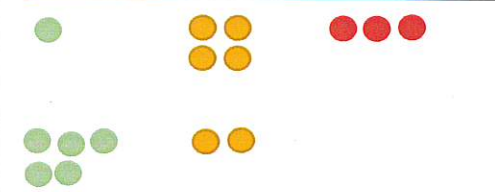
Calculation Guidance: Addition

Year 3: End of Year Objective:

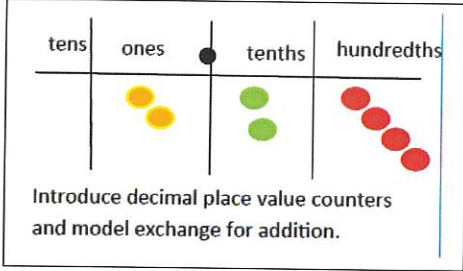
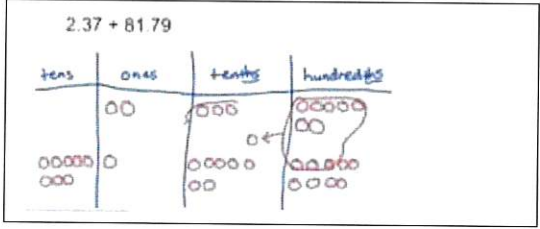
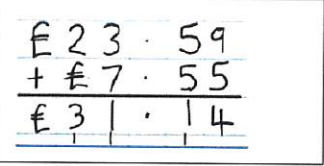
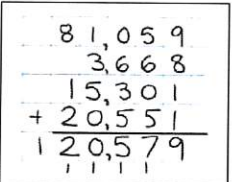
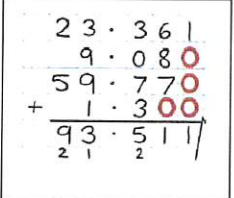
- Add numbers with up to three digits, using formal written method of columnar addition.

Year 4: End of Year Objective:

- Add numbers with up to 4 digits *and decimals with one decimal place* using the formal written method of columnar addition where appropriate.

	Objective	Concrete	Pictorial	Abstract
Year 3/4	Column method with regrouping	<p>Make both numbers on a place value grid.</p>  <p>146 + 527</p> <p>Add up the units and exchange 10 ones for 1 ten.</p>  <p>146 + 527</p> <p>As children move on to decimals, money and decimal place value counters can be used to support learning.</p>	<p>100s 10s 1s</p>  <p>100s 10s 1s</p>  <p>100s 10s 1s</p>	<p>As the children progress, they will move from the expanded to the compact</p> $\begin{array}{r} 146 \\ + 527 \\ \hline 673 \\ 1 \end{array}$ <p>As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here.</p>
		By Year 4 children will progress on to adding four digit numbers.		

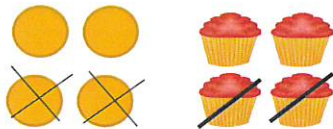
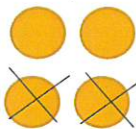
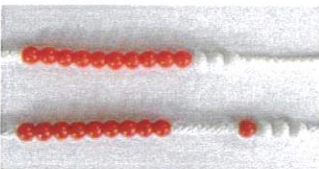
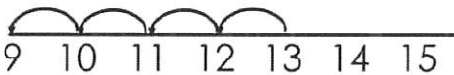
Calculation Guidance: Addition

Year 5: End of Year Objective: <ul style="list-style-type: none"> Add whole numbers with more than 4 digits and decimals with two decimal places, including formal written methods (columnar addition). 				
Year 6: End of Year Objective: <ul style="list-style-type: none"> Add whole numbers and decimals using formal written methods (columnar addition). 				
		Concrete	Pictorial	Abstract
Year 5/6		 <p>Introduce decimal place value counters and model exchange for addition.</p>	<p>Draw representations using a place value grid.</p> 	   <div>Inserting '0' as place holders</div>
Year 5/6	Column method with regrouping	Consolidate understanding using numbers with more than 4 digits and extend by adding numbers with up to 3 decimal places.		

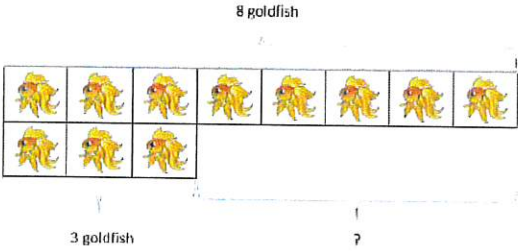
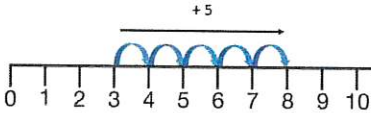
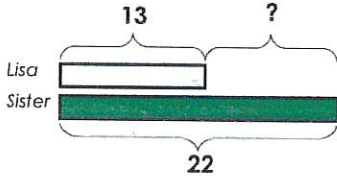
Calculation Guidance: Subtraction

Year 1 End of Year Objective:

- Subtract one-digit and two-digit numbers to 20, including zero (using concrete objects and pictorial representations).

	Objective	Concrete	Pictorial	Abstract
Year 1	Taking away ones	<p>Use physical objects, counters, cubes etc. to show how objects can be taken away.</p>  <p>$4 - 2 = 2$</p>	<p>Cross out drawn objects to show what has been taken away.</p>  <p>$4 - 2 = 2$</p>	<p>$4 - 2 = 2$</p>
Year 1	Counting back	<p>Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.</p>  <p>$13 - 4 = 9$</p>	<p>Count back on a number line or number track</p>  <p>Start at the bigger number and count back the smaller number, showing the jumps on the number line.</p>	<p>Put 13 in your head, count back 4. What number are you at? Use your fingers to help.</p>

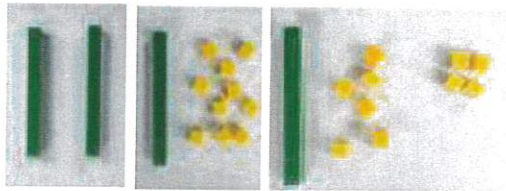

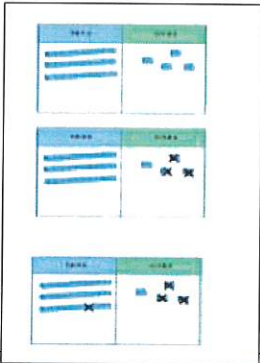
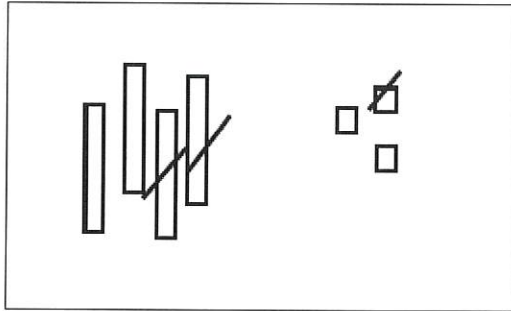
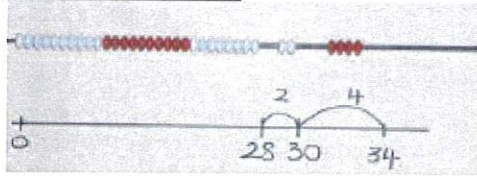
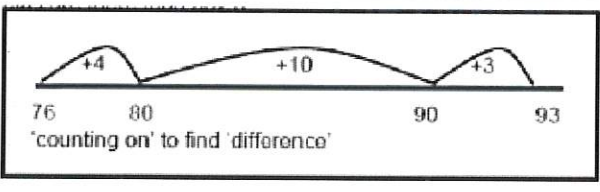
Calculation Guidance: Subtraction

Year 1	Find the difference	<p>Compare amounts and objects to find the difference.</p>  <p>Use cubes to build towers or make bars to find the difference. Use basic bar models with items to find the difference.</p>	 <p>Count on to find the difference.</p> <p><i>Lisa is 13 years old. Her sister is 22 years old. Find the difference in age between them.</i></p>  <p>Draw bars to find the difference between 2 numbers.</p>	<p>Hannah has 8 goldfish. Helen has 3 goldfish. Find the difference between the number of goldfish the girls have.</p>
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Calculation Guidance: Subtraction

Year 2 End of Year Objective:

- Subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers.

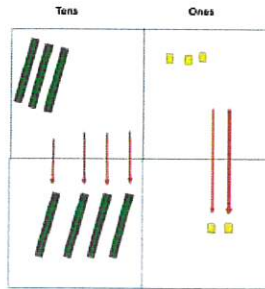
	Objective	Concrete	Pictorial	Abstract
Y2	Regroup a 10 into 10 ones	20-4 	 $20 - 4 =$	20-4=16
Y2	Partitioning to subtract without regrouping	34-13=21 (Using deins) 	Drawing Deins representations. 	34-13=21
Y2	Make 10 strategy	 34-28	 Counting on to find the difference	93-76=17

Calculation Guidance: Subtraction

Year 2

Column method without regrouping

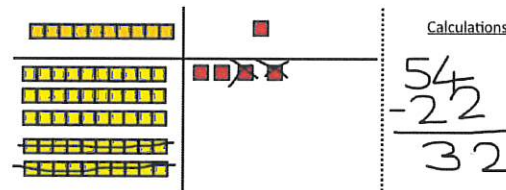
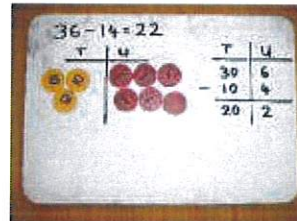
$$75 - 42 = 33$$



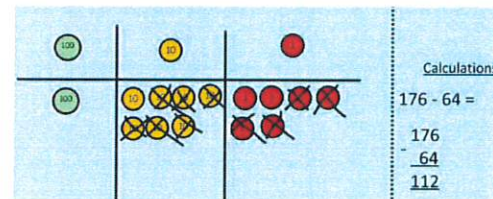
Use Base 10 to make the bigger number then take the smaller number away.

Show how you partition numbers to subtract.

Again make the larger number first.



Draw the Base 10 or place value counters alongside the written calculation to help to show working.



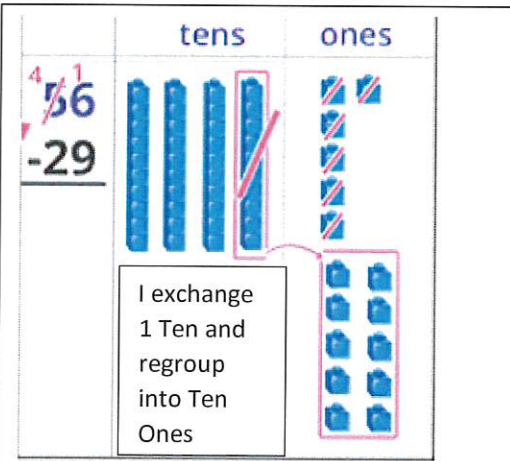
$$47 - 24 = 23$$

$$\begin{array}{r} 40 + 7 \\ - 20 + 4 \\ \hline 20 + 3 \end{array}$$

Leading into a clear written method.

$$\begin{array}{r} 32 \\ - 12 \\ \hline 20 \end{array}$$

Calculation Guidance: Subtraction

Year 2	Column method with regrouping	<p>Using base 10 to develop concrete understanding.</p>  <p>I exchange 1 Ten and regroup into Ten Ones</p> <p>Vocabulary to use: Exchange and regroup- Take and Make</p>	<p>As concrete methods using pictorial representation of deins</p>	<p>Regrouping to focus on using concrete resources.</p> <p>Abstract method for regrouping to be initially introduced in Y3, Although a written method may be modelled whilst using base 10.</p>
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Calculation Guidance: Subtraction

Year 3: End of Year Objective:

- Subtract numbers with up to three digits, using formal written method of columnar subtraction.

Year 4: End of Year Objective:

- Subtract numbers with up to 4 digits and decimals with one decimal place using the formal written method of columnar subtraction where appropriate.

Year 5: End of Year Objective:

- Subtract whole numbers with more than 4 digits and decimals with two decimal places, including formal written methods (columnar subtraction)- Including money and measure
- Subtract with decimal values, including mixtures of integers and decimals and aligning the decimal

Year 6: End of Year Objective:

- Subtract whole numbers and decimals using formal written methods (columnar subtraction)-Including money and more complex measures
- Increasingly large and more complex numbers and decimal values, in a variety of context.

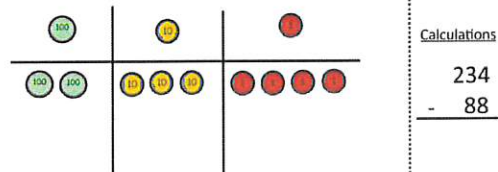
Calculation Guidance: Subtraction

Year 3 onwards

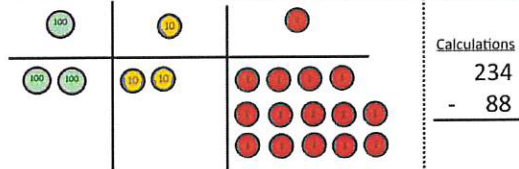
Column method with regrouping

Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges.

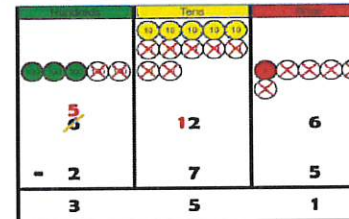
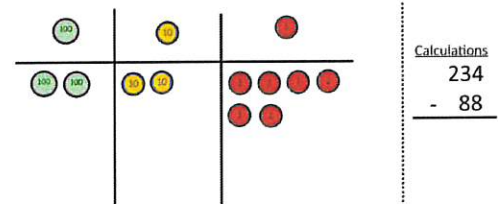
Make the larger number with the place value counters



Start with the ones, can I take away 8 from 4 easily? I need to **exchange** 1 of my tens for 10 ones- **exchange and regroup**



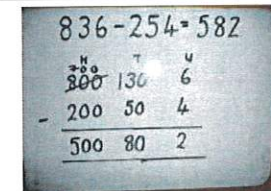
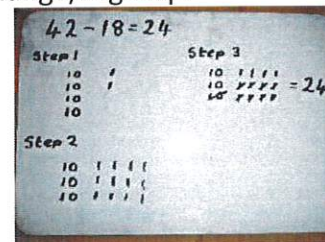
Now I can subtract my ones.



Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.

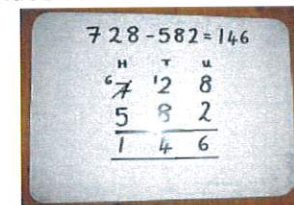
When confident, children can find their own way to record the exchange/regrouping.

Just writing the numbers as shown here shows that the child understands the method and knows when to exchange/regroup.



Year 3

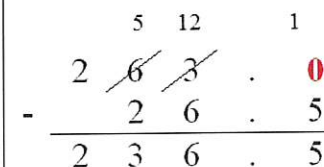
Children can start their formal written method by partitioning the number into clear place value columns.



Year 3

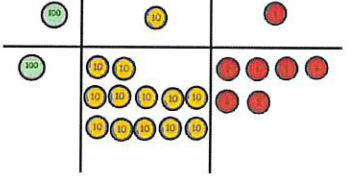
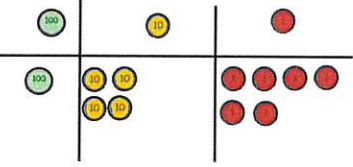
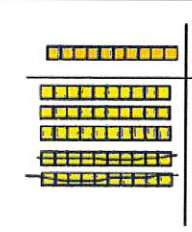
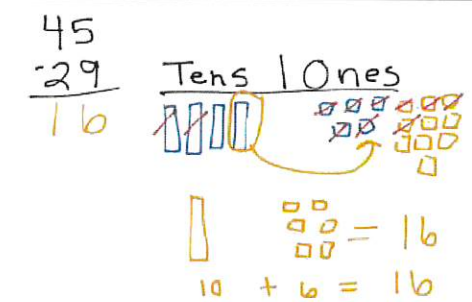
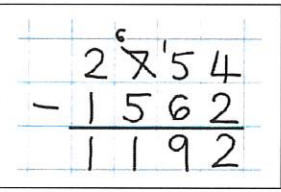
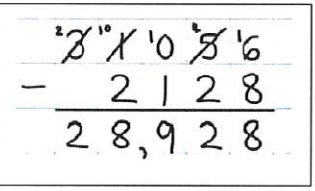
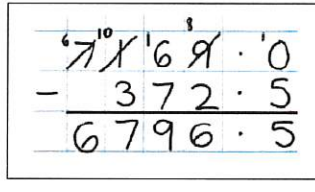
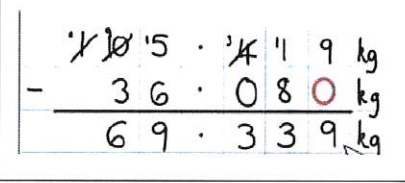
Moving forward the children use a more compact method.

This will lead to an understanding of subtracting any number including decimals.



Year 4
Development


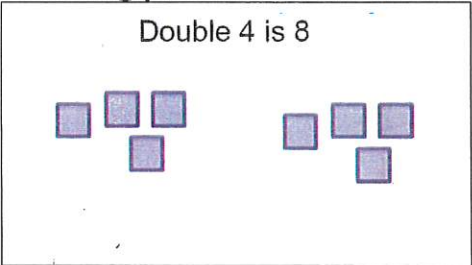
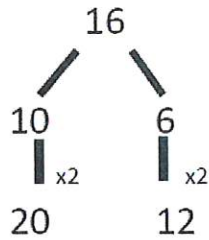
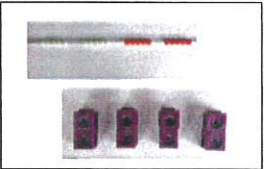
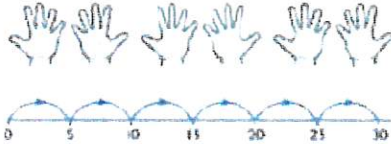
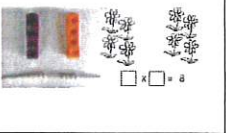
Calculation Guidance: Subtraction

	Objective	Concrete	Pictorial	Abstract
Year 3 and beyond	Column method with regrouping	<p>Now look at the tens, can I take away 8 tens easily? I need to exchange 1 hundred for 10 tens.</p>  <p>Calculations</p> $\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$ <p>Now I can take away 8 tens and complete my subtraction.</p>  <p>Calculations</p> $\begin{array}{r} 234 \\ - 88 \\ \hline 146 \end{array}$ <p>Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.</p>	 <p>Calculations</p> $\begin{array}{r} 54 \\ - 22 \\ \hline 32 \end{array}$  <p>Tens Ones</p> <p>10 + 6 = 16</p>	<p>Increasing complexity- Y4-Y6</p>     <p>Children use vocabulary of:</p> <p>Take and Make leading onto Exchange and regroup.</p> <p>Use '0' for place value holders.</p>

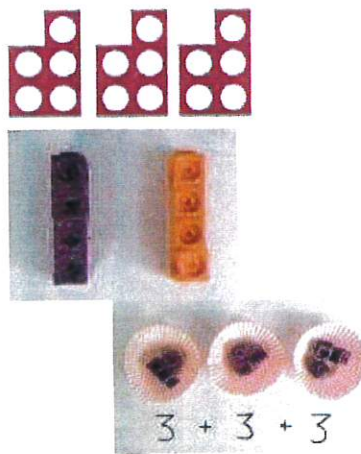
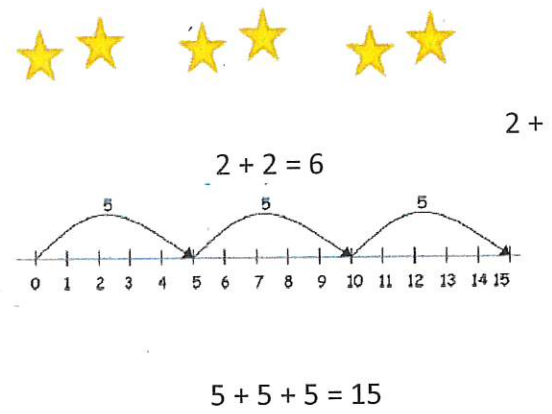

Calculation Guidance: Multiplication

Year 1 End of Year Objective:


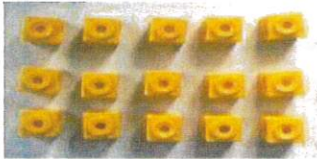


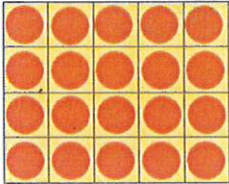

- Solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

	Objective	Concrete	Pictorial	Abstract
1	Doubling	Practical Activities (cubes/ numicon/ counters) 	Drawing pictures to show doubling 	 <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Also a good jotting method to use in subsequent year groups </div>
1	Counting in multiples	Count in multiples- of equal groups 	 <p>Use a number line or pictures to continue support in counting in multiples.</p>	Count in multiples of numbers aloud: Write sequences with multiples of numbers: 2,4,6,8,10 5,10,15,20 10,20,30,40
Year 1	Making equal groups and counting the total		Drawing and making representations Eg Draw ★ to show 2 x 3	$2 \times 3 = 6$
21 Page		Using manipulatives to make the totals		

Calculation Guidance: Multiplication

<p align="center"><u>Year 2 End of Year Objective:</u></p> <ul style="list-style-type: none"> Calculate mathematical statements for multiplication (<i>using repeated addition</i>) and write them using the multiplication (x) and equals (=) signs. 				
Year 1/2	Repeated addition	 <p align="center">Use different objects to add equal groups.</p>	<p>There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?</p>  <p align="center">$2 + 2 = 6$</p> <p align="center">$5 + 5 + 5 = 15$</p>	<p>Write addition sentences to describe objects and pictures.</p>  <p>$2 + 2 + 2 = 6$</p>

Calculation Guidance: Multiplication

<div data-bbox="163 579 197 660">Year 2</div>	<p>Arrays- showing commutative multiplication</p>	<p>Create arrays using counters/cubes to show multiplication sentences.</p> <div data-bbox="465 304 875 611">  </div> <div data-bbox="515 635 831 794">  </div>	<p>Draw arrays in different rotations to find commutative multiplication sentences.</p> <div data-bbox="1003 309 1167 389">  </div> <div data-bbox="1205 301 1323 330"> $4 \times 2 = 8$ </div> <div data-bbox="1003 421 1115 448"> $2 \times 4 = 8$ </div> <div data-bbox="1227 421 1305 587">  </div> <div data-bbox="1330 496 1449 525"> $2 \times 4 = 8$ </div> <div data-bbox="1220 619 1341 647"> $4 \times 2 = 8$ </div> <p>Link arrays to area of rectangles.</p> <div data-bbox="1111 692 1339 876">  </div>	<p>Use an array to write multiplication sentences and reinforce repeated addition.</p> <div data-bbox="1709 347 1917 480">  </div> <div data-bbox="1579 501 1861 544"> $5 + 5 + 5 = 15$ </div> <div data-bbox="1579 576 2013 619"> $3 + 3 + 3 + 3 + 3 = 15$ </div> <div data-bbox="1579 655 1789 699"> $5 \times 3 = 15$ </div> <div data-bbox="1579 735 1792 778"> $3 \times 5 = 15$ </div>
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Calculation Guidance: Multiplication

Year 3- End of Year Objective:

- Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, progressing to formal written methods.*

	Objective	Concrete	Pictorial	Abstract																				
Year 3	Grid method	<p>Show the link with arrays to first introduce the grid method.</p> <table border="1"><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"><tr><td>x</td><td>T</td><td>U</td></tr><tr><td>4</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>Fill each row with 26.</p> <table border="1"><tr><td></td><td>4 x 26</td></tr></table> <p>Add up each column, starting with the ones making any exchanges needed.</p> <p>4 x 26= 104</p>	x	10	3	4			x	T	U	4				4 x 26	<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>Start with multiplying by one digit numbers and showing the clear addition alongside the grid. Children will need to have a good concept of multiplying by multiples of 10.</p> <p>7 x 3 = 21 7 x 30 = 210</p> <div><div>21 </div><div>210 </div></div> <table border="1"><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>	x	30	5	7	210	35
x	10	3																						
4																								
x	T	U																						
4																								
	4 x 26																							
x	30	5																						
7	210	35																						

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Calculation Guidance: Multiplication

Year 4 End of Year Objective:

- Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.

	Objective	Concrete	Pictorial	Abstract																					
4	Grid Method as in Y3- using 3 digit numbers	As Y3- introducing 3 digit by 1 digit	As Y3-Introdoucing 3 digit by 1 digit 123 x 4 (Step 1) <table><tr><td>X</td><td>100</td><td>20</td><td>3</td></tr><tr><td>4</td><td>400</td><td>80</td><td>12</td></tr></table>	X	100	20	3	4	400	80	12	(Step 2) Expanded method- working alongside grid representation initially. <div>123 X 4 12 (4 x 3) 80 (4 x 20) <u>400 (4 x 100)</u> 482</div>													
X	100	20	3																						
4	400	80	12																						
4	Development into written expanded method	As above Visual representation: (Base 10 and place value counters) <div><table><tr><th>H</th><th>T</th><th>O</th></tr><tr><td>100 100</td><td>10</td><td>10 10 10</td></tr><tr><td>100 100</td><td>10</td><td>10 10 10</td></tr><tr><td>100 100</td><td>10</td><td>10 10 10</td></tr></table><table><tr><th>H</th><th>T</th><th>O</th></tr><tr><td>2</td><td>1</td><td>5</td></tr><tr><td>x</td><td></td><td>3</td></tr></table></div>	H	T	O	100 100	10	10 10 10	100 100	10	10 10 10	100 100	10	10 10 10	H	T	O	2	1	5	x		3	As above Grid method	Developing to 3 digits. 123 x 4 <div>123 X 4 482 1</div>
H	T	O																							
100 100	10	10 10 10																							
100 100	10	10 10 10																							
100 100	10	10 10 10																							
H	T	O																							
2	1	5																							
x		3																							

Calculation Guidance: Multiplication

Year 5 End of Year Objective:

- 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

Year 6 End of Year Objective:

- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.
- Multiply one-digit numbers with up to two decimal places by whole numbers.

<div data-bbox="152 858 239 1011"> Yea r 5 </div>	<div data-bbox="322 616 353 852">Expanded method</div>	<p>Show the link with arrays to first, if required, introduce the expanded method for 2 digit numbers</p> <div data-bbox="636 762 918 995"> </div>	<p>Draw to represent the calculation</p> <p>$18 \times 13 =$</p> <div data-bbox="1223 724 1518 973"> </div>	<p>May initially need to return to grid to show clear conceptual understanding.</p> <div data-bbox="1608 718 1980 1181"> </div>
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Calculation Guidance: Multiplication

				<div>Start with long multiplication, reminding the children about lining up their numbers clearly in columns.</div> <div><div><div>18</div><div>x 13</div><div>24 (3 x 8)</div><div>30 (3 x 10))</div><div>80 (10 x 8)</div><div>100 (10 x 10)</div><div>234</div></div></div>
Year 5/6	Compact method	Children can continue to be supported by place value counters at the stage of multiplication if required.	Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.	<div>Start with long multiplication, reminding the children about lining up their numbers clearly in columns.</div> <div>If it helps, children can write out what they are solving next to their answer- as before. This moves to the more compact method. This compact method should be used in Year 5 and 6</div> <div><div><div><div>1,207 x 36</div><div><div>TThThHTO</div><div><div>1207</div><div>x36</div><div><div>7242</div><div>36210</div><div>43452</div></div></div></div><div>(1,207 x 6)</div><div>(1,207 x 30)</div></div></div></div>

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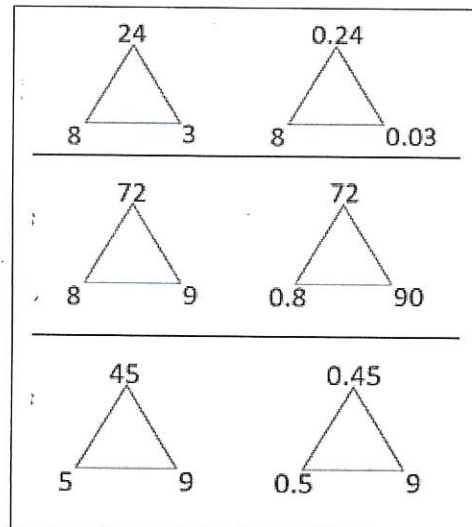
Calculation Guidance: Multiplication

Decimal Multiplication (Y6)

If required children may use place value counters to aid understanding of multiplying by decimals.
Money examples will support practical experiences of multiplying by decimals.
Eg £4.92 x 3

Decimal multiplication may also be a part of multiplying by measures (eg g/ml and money)

Use of related facts as below:



Strategies of decimal multiplication:

$$3.19 \times 8$$

- Use estimation- what do you estimate the answer to be.
(eg $3 \times 8 = 24$)
- Multiplication of numbers to make them easier and adjusting the answer. Eg $3.19 \times 100 = 319$
 $319 \times 8 = 2552$.
Now divide the number by 100
- Calculate initially by removing the decimal- $319 \times 8 = 2552$ -
How many digits after the decimal in the questions- ensure this is the same in the answer (this method must be supported with clear conceptual understanding how how this works as a method
- Always ensure digits are correctly lined up in the right column eg:

$$\begin{array}{r} \text{T U. t h} \\ 3. 19 \\ \times 8 \\ \hline 25.52 \end{array}$$

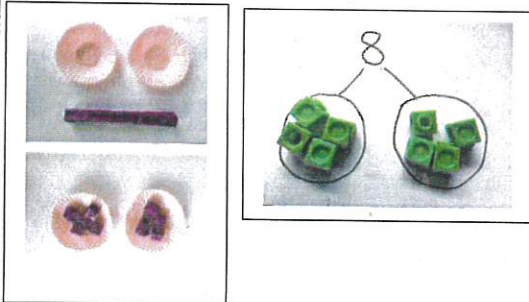
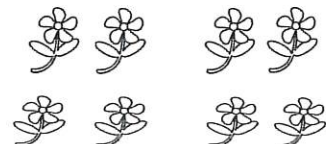
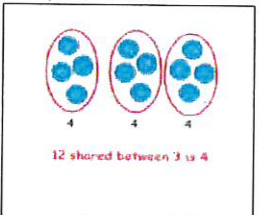
Calculation Guidance: Division

Year 1- End of Year Objective:

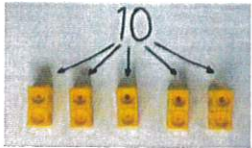
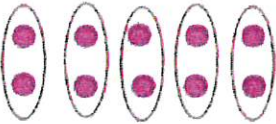
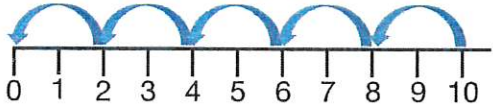
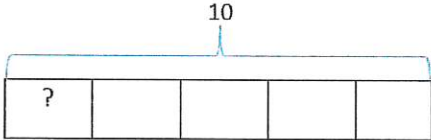
- Solve one-step problems involving division by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Year 2 End of Year Objective:

- Calculate mathematical statements for division within the multiplication tables and write them using the division (\div) and equals (=) signs.

	Objective	Concrete	Pictorial	Abstract
Year 1/2	Sharing Division as sharing	I have 8 cubes, can you share them equally between two people? 	Children use pictures or shapes to share quantities.  $8 \div 2 = 4$  12 shared between 3 is 4	Share 8 buns between two people. $8 \div 2 = 4$

Calculation Guidance: Division

Year 1/2	Grouping	<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>$10 \div 5 = ?$</p> <p>$5 \times ? = 10$</p>	<p>$10 \div 5 = 2$</p> <p>Divide 10 into 5 groups. How many are in each group?</p>
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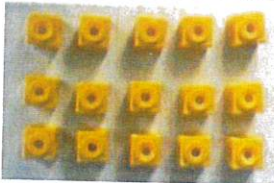
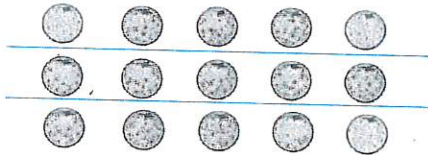
Calculation Guidance: Division

Year 3 End of Year Objective:

- Write and calculate mathematical statements for division using the multiplication tables that they know, including for two-digit numbers divided by one-digit numbers, progressing to formal written methods

Year 4. End of Year Objective:

- Divide numbers up to 3 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.

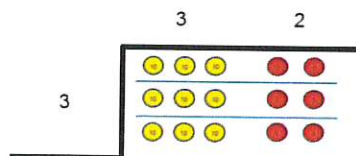
	Objective	Concrete	Pictorial	Abstract
Year 3	Division with arrays	<p>Link division to multiplication by creating an array and thinking about the number sentences that can be created.</p> <p>Eg $15 \div 3 = 5$ $5 \times 3 = 15$ $15 \div 5 = 3$ $3 \times 5 = 15$</p> 	<p>Draw an array</p>  <p>and use lines 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>$5 \times 3 = 15$ $3 \times 5 = 15$ $15 \div 5 = 3$ $15 \div 3 = 5$</p>

Calculation Guidance: Division

Year 3-
Leading
into short
division
methods-
no
remainders

Use place value counters to divide using the short division method alongside.

$$96 \div 3$$



$$42 \div 3$$

Start with the biggest place value.

We are

sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.

We exchange

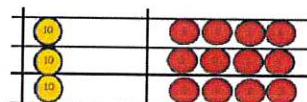
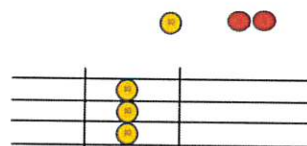
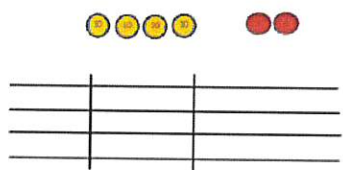
this ten for 10 ones and then

share the ones equally among the groups. We

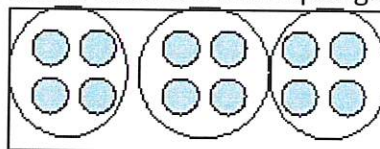
look at how

many are in

each group.

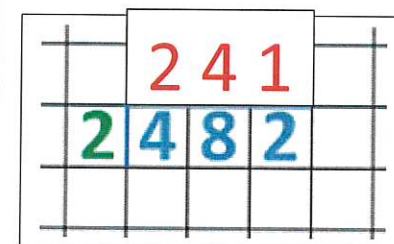
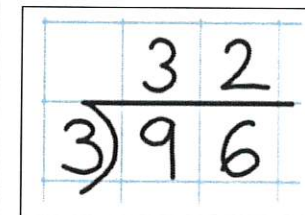


Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.

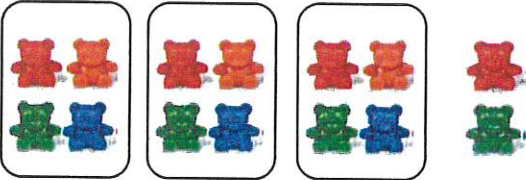
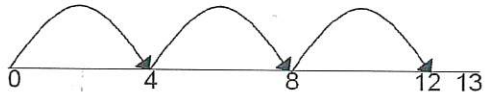



Encourage them to move towards counting in multiples to divide more efficiently.

Begin with divisions that divide equally with no remainder.



Calculation Guidance: Division

	Objective	Concrete	Pictorial	Abstract
Year 3- leading into division with remainders		<p>$14 \div 3 =$ Divide objects between groups and see how much is left over- using practical and real life context.</p> 	<p>Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.</p>  <p>Draw dots and group them to divide an amount and clearly show a remainder.</p> 	<p>Complete written divisions and show the remainder using r. Children using understanding of known timetables to recall and calculate division sums with remainders</p> $29 \div 8 = 3 \text{ REMAINDER } 5$ <p> ↑ ↑ ↑ ↑ dividend divisor quotient remainder </p>

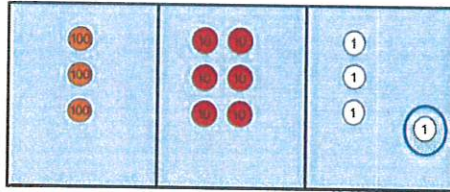
Calculation Guidance: Division

Year 4

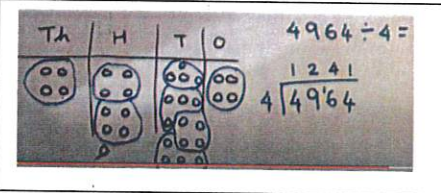
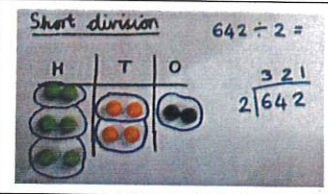
Short division with remainders

$$364 \div 3 =$$

$$\begin{array}{r} 121 \text{ rem } 1 \\ 3 \overline{) 364} \end{array}$$



This method as well as being done practically, could also be done using dots. Starting with no remainders and leading into remainders



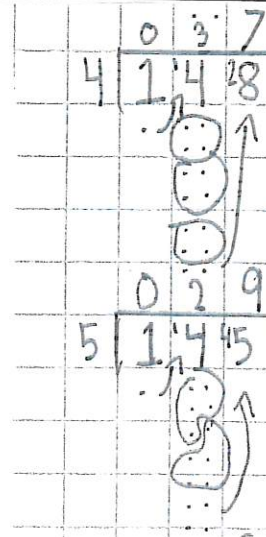
In the second method it is important for children to realise that the Hundred that is remaining – when moved to the tens column is 10 lots of 10 (= 100)

Move onto division with a remainder, in an abstract way without resources.

(Known as bus stop method)

$$\begin{array}{r} 218 \\ 3 \overline{) 654} \end{array}$$

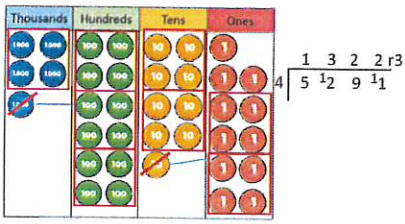
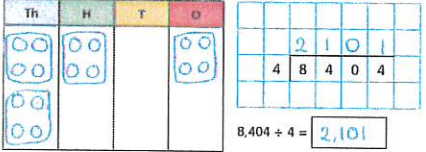
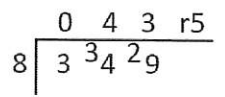
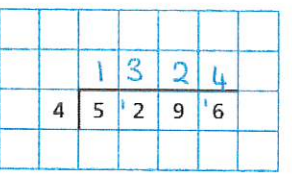
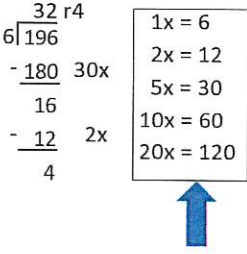
(DIVISOR) (DIVIDEND) (BUS STOP)



Calculation Guidance: Division

Year 5 End of Year Objective:

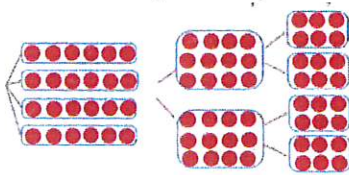
- Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context- eg rounding up or down after division.

	Objective	Concrete	Pictorial	Abstract
Year 5		<p>$5,291 \div 4 = 1,322 \text{ r}3$</p> 	<p>Use the place value chart to work out $8,404 \div 4$</p> 	  <p>In preparation for division of 2 digits in Y6 children may also start to look at chunking. (See example below)</p>  <p>Key fact box to aid accurate calculations</p>

Calculation Guidance: Division

Year 6-End of Year Objective:

- Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context.
- Use written division methods in cases where the answer has up to two decimal places.

		Concrete	Pictorial	Abstract
				<p>Children develop chunking method to include division by 2 digit numbers:</p> <div> $\begin{array}{r} 155 \text{ r}4 \\ 26 \overline{)4034} \\ \underline{-2600} \quad 100x \\ 1434 \\ \underline{-1300} \quad 50x \\ 134 \\ \underline{-130} \quad 5x \\ 4 \end{array}$ </div> <div> $\begin{array}{l} 1 \times 26 = 26 \\ 2 \times 26 = 520 \\ 5 \times 26 = 130 \\ 10 \times 26 = 260 \end{array}$ </div>
				<p>Drop down method</p> <div> $\begin{array}{r} \overline{4811} \\ 17 \overline{)4811} \\ \underline{-34} \\ 141 \\ \underline{-136} \\ 51 \\ \underline{-51} \\ 0 \end{array}$ </div> <div> $\begin{array}{r} 17 \\ 34 \\ 51 \\ 68 \\ 85 \\ 102 \\ 119 \\ 136 \\ 153 \\ 170 \end{array}$ </div>
			<p>Division using factor pairs:</p>  $24 \div 4 = 6$ $24 \div 2 \div 2 = 6$ <p>(factors of 4 = 2x2)</p>	<div> $720 \div 24 = 30$ $720 \div 6 = 120$ $120 \div 4 = 30$ $720 \div 12 = 60$ $60 \div 2 = 30$ </div> <div> <p>1 and 24 24 4 and 6</p> <p>2 and 12 3 and 8</p> </div>