

St White's Primary School Calculation Policy

This policy outlines the mental and written methods which should be taught from Year 1 to Year 6. The policy has been written according to the National Curriculum 2014 and the written calculations for all four operations can be found here. The policy builds on the interconnectedness of the mathematics and outlines the progression for addition, subtraction, multiplication and division. It is our intention that addition and subtraction should be taught at the same time to ensure children are able to see the clear links between the operations and the inverse nature of them along with multiplication and division.

Children should secure mental strategies, they are taught the strategy of counting forwards and backwards in ones and tens first. Children are taught to look carefully at the calculation and decide which strategy they should use. Children should explain and reason as to why they have chosen a specific strategy and whether it is the most efficient.

The formal written methods should be introduced with caution. Calculations which require a written method should be presented to the children and the models and images such as dienes apparatus, place value counters etc. Should be used to ensure children have a conceptual understanding of the written method and that it is not a process that the children use for every type of calculation regardless of whether it can be completed mentally or mentally with jotting i.e number line.

The policy outlines the **mental strategies** that children should be encouraged to use:

A mental strategy that they can always rely on E.g. counting in tens and ones, forwards and backwards, **for instance, $56 - 25$ (count back in 10s 56, 46, 36 and back in ones 36, 35, 34, 33, 32, 31)**

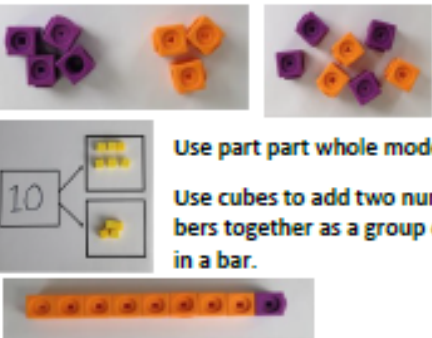
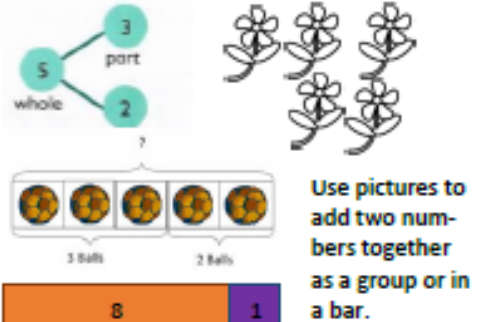


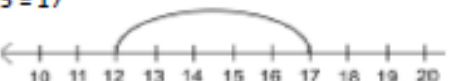
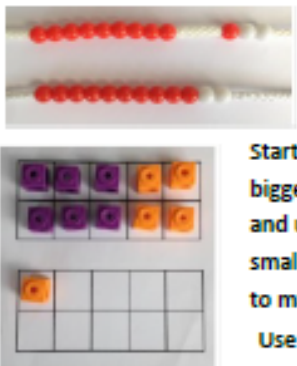

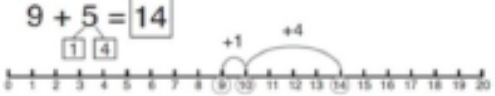

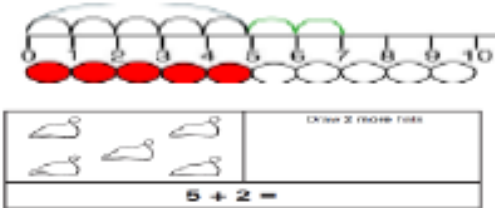
A special strategy they can select from a small range of strategies, if they can see something special about the numbers they are being asked to calculate with, **for instance, $46 - 24$ (I can use near doubles to support my calculation $46 - 23 - 1$)**

The policy outlines the **written methods** as suggested on the appendices of the Curriculum 2014 and suggests that children:

- Look at the calculation and decide whether it can be done mentally, mentally with jotting or whether it needs a written method.
- Should always be shown written methods with place value apparatus to ensure children are clear about the value of the numbers that they are calculating with and the numbers do not just become digits.
- Estimate, calculate and check to ensure that the answer they generate has some meaning.

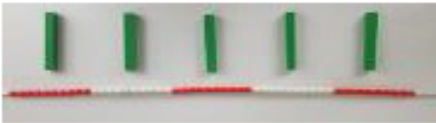

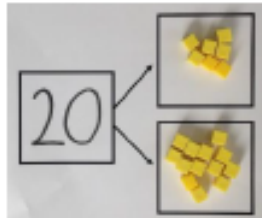
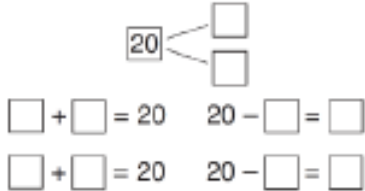
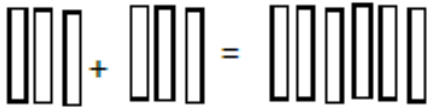



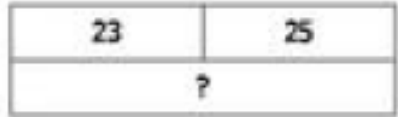
For the purpose of developing understanding there may be occasions when examples that can be completed mentally may be shown is a written method purely to develop understanding of the method. These need to be made clear to children and when they are practising the methods, appropriate calculations should be used.

Y1 ADDITION +

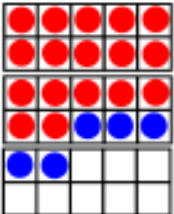

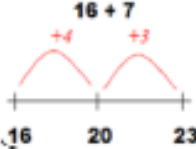
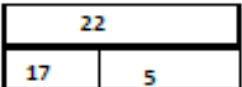

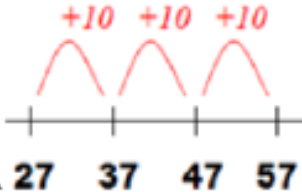

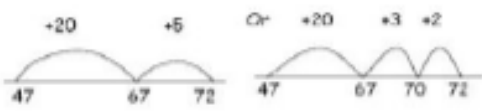

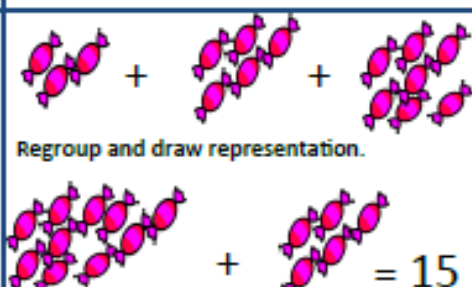
Objective & Strategy	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part- whole model	 <p>Use part part whole model.</p> <p>Use cubes to add two numbers together as a group or in a bar.</p>	 <p>Use pictures to add two numbers together as a group or in a bar.</p>	<p>$4 + 3 = 7$</p>  <p>Use the part-part whole diagram as shown above to move into the abstract.</p> <p>$10 = 6 + 4$</p>
Starting at the bigger 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>$12 + 5 = 17$</p>  <p>Start at the larger number on the number line and count on in ones or in one jump to find the answer.</p>	<p>$5 + 12 = 17$</p> <p>Place the larger number in your head and count on the smaller number to find your answer.</p>
Regrouping to make 10. <i>This is an essential skill for column addition later.</i>	 <p>$6 + 5 = 11$</p> <p>Start with the bigger number and use the smaller number to make 10.</p> <p>Use ten frames.</p>	 <p>$3 + 9 =$</p> <p>Use pictures or a number line. Regroup or partition the smaller number using the part part whole model to make 10.</p> <p>$9 + 5 = 14$</p> 	<p>$7 + 4 = 11$</p> <p>If I am at seven, how many more do I need to make 10. How many more do I add on now?</p>
Represent & use number bonds and related subtraction facts within 20	 <p>2 more than 5.</p>	 <p>$5 + 2 =$</p>	<p>Emphasis should be on the language</p> <p>'1 more than 5 is equal to 6.'</p> <p>'2 more than 5 is 7.'</p> <p>'8 is 3 more than 5.'</p>

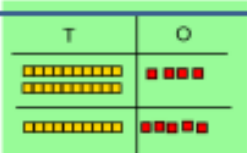

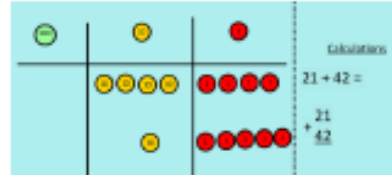

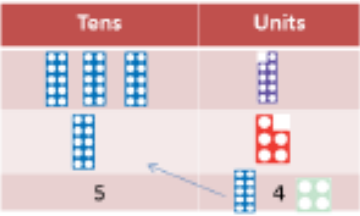
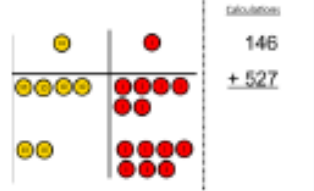
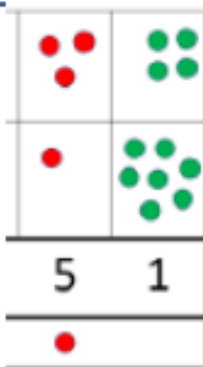
Y2

ADDITION +

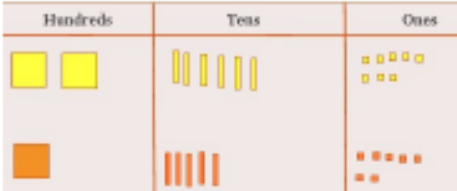
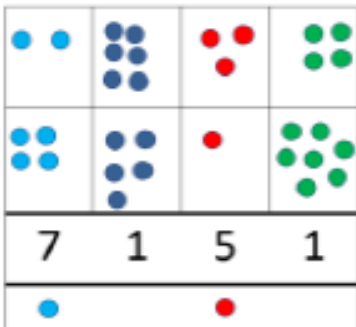
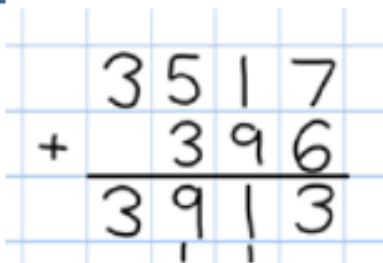

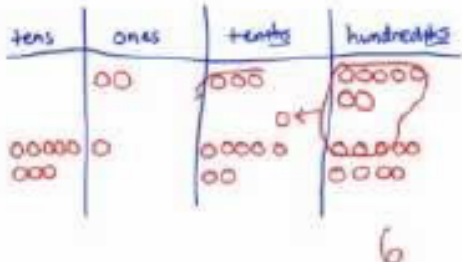
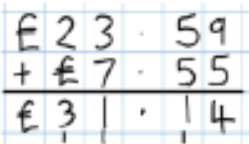
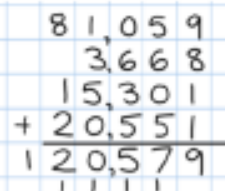
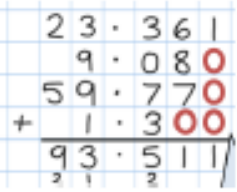
Objective & Strategy	Concrete	Pictorial	Abstract
Adding multiples of ten	$50 = 30 + 20$  Model using dienes and bead strings	 $3 \text{ tens} + 5 \text{ tens} = \text{ } \text{tens}$ $30 + 30 = \text{ }$ Use representations for base ten.	$20 + 30 = 50$ $70 = 50 + 20$ $40 + \square = 60$
Use known number facts <i>Part part whole</i>	 Children explore ways of making numbers within 20	 $\square + \square = 20$ $20 - \square = \square$ $\square + \square = 20$ $20 - \square = \square$	$\square + 1 = 16$ $16 - 1 = \square$ $1 + \square = 16$ $16 - \square = 1$
Using known facts	$\square\square + \square\square = \square\square\square\square$ 	 Children draw representations of H, T and O	$3 + 4 = 7$ <i>leads to</i> $30 + 40 = 70$ <i>leads to</i> $300 + 400 = 700$
Bar model	 $3 + 4 = 7$	 $7 + 3 = 10$	 $23 + 25 = 48$

Y2 ADDITION +

Objective & Strategy	Concrete	Pictorial	Abstract
Add a two digit number and ones Children explore the pattern. $17 + 5 = 22$ $27 + 5 = 32$	 <p>Use ten frame to make 'magic ten'</p>	<p>Use part part whole and number line to model.</p> <p>$17 + 5 = 22$</p>  <p>$16 + 7$</p> 	$17 + 5 = 22$ Explore related facts $17 + 5 = 22$ $5 + 17 = 22$ $22 - 17 = 5$ $22 - 5 = 17$ 
Add a 2 digit number and tens Explore that the ones digit does not change	 <p>$25 + 10 = 35$</p>	<p>$27 + 30$</p> 	$27 + 10 = 37$ $27 + 20 = 47$ $27 + \square = 57$
Add two 2-digit numbers Model using dienes, place value counters and numicon		 <p>Use number line and bridge ten using part whole if necessary.</p>	<p>$25 + 47$</p> <p>$20 + 5$ $40 + 7$</p> <p>$20 + 40 = 60$</p> <p>$5 + 7 = 12$</p> <p>$60 + 12 = 72$</p>
Add three 1-digit numbers Combine to make 10 first if possible, or bridge 10 then add third digit		 <p>Regroup and draw representation.</p> <p>$4 + 7 + 4 = 15$</p>	<p>$4 + 7 + 4 = 10 + 7$</p> <p>$10 + 7 = 17$</p> <p>Combine the two numbers that make/ bridge ten then add on the third.</p>


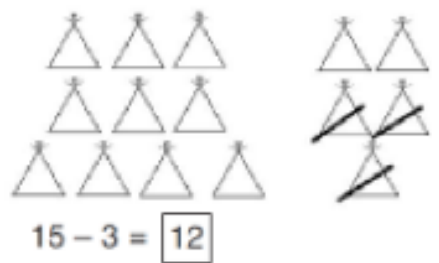
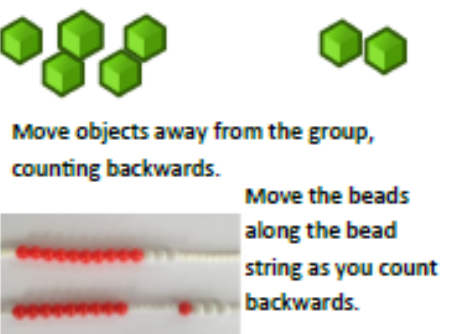
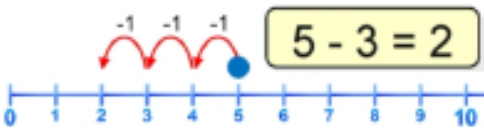
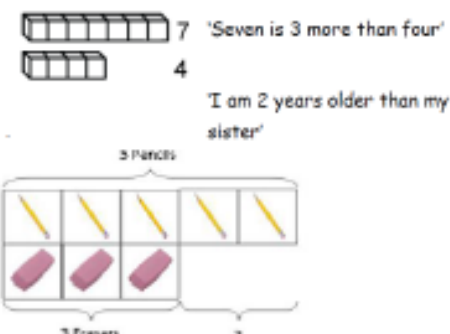
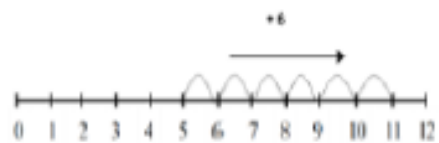
Objective & Strategy	Concrete	Pictorial	Abstract
<p>Column Addition—no regrouping (friendly numbers)</p> <p>Add two or three 2 or 3-digit numbers.</p>	<p>Model using Dienes or numicon</p>  <p>Add together the ones first, then the tens.</p>  <p>7 9</p>  <p>21 + 42 =</p> <p>21 + 42</p> <p>Move to using place value counters</p>	<p>Children move to drawing the counters using a tens and one frame.</p> 	$\begin{array}{r} 223 \\ + 114 \\ \hline 337 \end{array}$ <p>Add the ones first, then the tens, then the hundreds.</p>
<p>Column Addition with regrouping.</p>	 <p>5 4</p> <p>Exchange ten ones for a ten. Model using numicon and pv counters.</p>  <p>146 + 527</p>	 <p>Children can draw a representation of the grid to further support their understanding, carrying the ten <u>underneath</u> the line</p>	$\begin{array}{r} 20 + 5 \\ 40 + 8 \\ 60 + 13 = 73 \end{array}$ <p>Start by partitioning the numbers before formal column to show the exchange.</p> $\begin{array}{r} 536 \\ + 85 \\ \hline 621 \\ 11 \end{array}$

Y3 ADDITION +

Objective & Strategy	Concrete	Pictorial	Abstract
<p>Y4—add numbers with up to 4 digits</p>	<p>Children continue to use dienes or pv counters to add, exchanging ten ones for a ten and ten tens for a hundred and ten hundreds for a thousand.</p> 	 <p>Draw representations using pv grid.</p>	 <p>Continue from previous work to carry hundreds as well as tens.</p> <p>Relate to money and measures.</p>
<p>Y5—add numbers with more than 4 digits.</p> <p>Add decimals with 2 decimal places, including money.</p>	<p>As year 4</p>  <p>Introduce decimal place value counters and model exchange for addition.</p>	<p>2.37 + 81.79</p> 	<p>72.8</p> <p>+ 54.6</p> <p>127.4</p> <p>1 1</p> 
<p>Y6—add several numbers of increasing complexity</p> <p>Including adding money, measure and decimals with different numbers of decimal points.</p>	<p>As Y5</p>	<p>As Y5</p>	 <p>Insert zeros for place holders.</p> 

Y4-6

ADDITION +

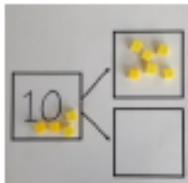
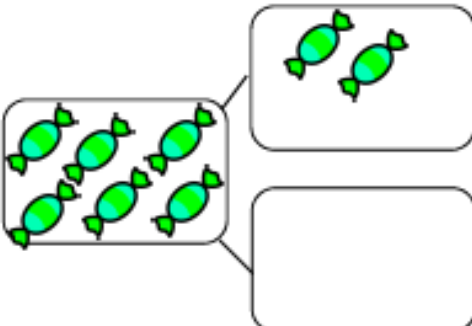





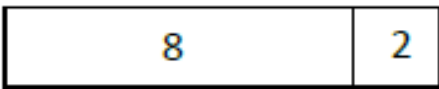
Objective & Strategy	Concrete	Pictorial	Abstract
Taking away ones.	<p>Use physical objects, counters, cubes etc to show how objects can be taken away.</p>  <p>$6 - 4 = 2$</p> <p>$4 - 2 = 2$</p>	 <p>$15 - 3 = 12$</p> <p>Cross out drawn objects to show what has been taken away.</p>	<p>$7 - 4 = 3$</p> <p>$16 - 9 = 7$</p>
Counting back	 <p>Move objects away from the group, counting backwards.</p> <p>Move the beads along the bead string as you count backwards.</p>	 <p>$5 - 3 = 2$</p> <p>Count back in ones using a number line.</p>	<p>Put 13 in your head, count back 4. What number are you at?</p>
Find the Difference	<p>Compare objects and amounts</p>  <p>7 'Seven is 3 more than four'</p> <p>4</p> <p>'I am 2 years older than my sister'</p> <p>3 Pencils</p> <p>3 Trawlers</p> <p>7</p> <p>Lay objects to represent bar model.</p>	<p>Count on using a number line to find the difference.</p>  <p>+6</p>	<p>Hannah has 12 sweets and her sister has 5. How many more does Hannah have than her sister.?</p>

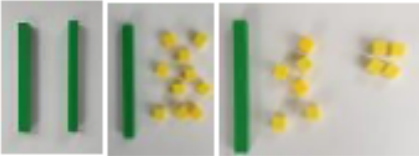



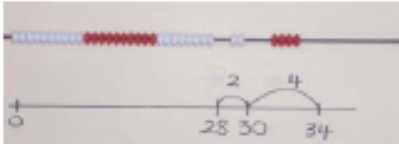
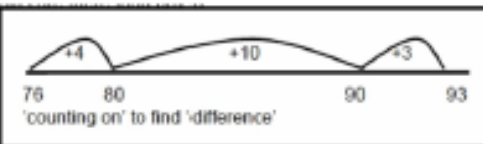
Y1

SUBTRACTION -

Y1

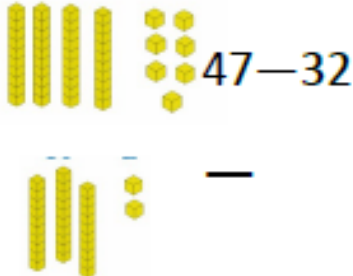
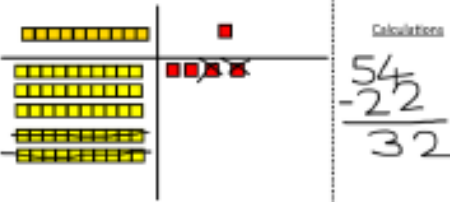
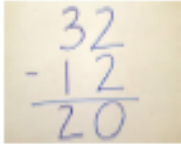
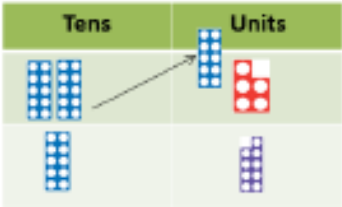
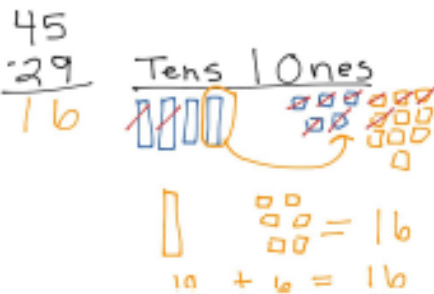
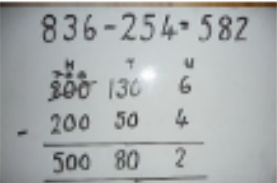
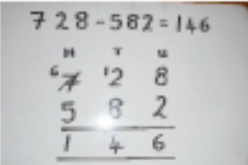
SUBTRACTION -

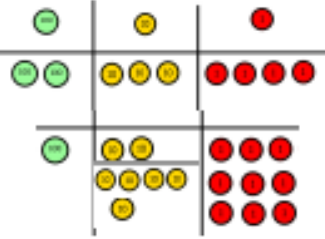
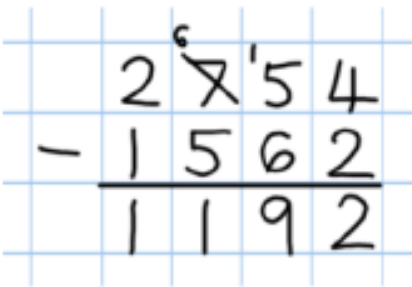
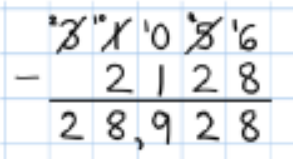
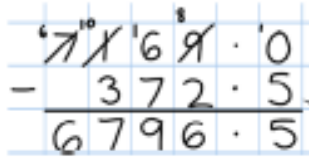
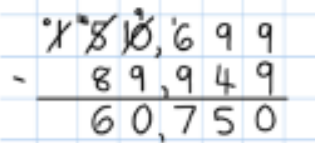
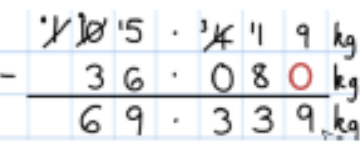
Objective & Strategy	Concrete	Pictorial	Abstract
<p>Represent and use number bonds and related subtraction facts within 20</p> <p>Part Part Whole model</p>	 <p>Link to addition. Use PPW model to model the inverse.</p> <p>If 10 is the whole and 6 is one of the parts, what's the other part?</p> $10 - 6 = 4$	 <p>Use pictorial representations to show the part.</p>	<p>Move to using numbers within the part whole model.</p> 
<p>Make 10</p>	<p>14—9</p>  <p>Make 14 on the ten frame. Take 4 away to make ten, then take one more away so that you have taken 5.</p>	<p>13—7</p>  <p>Jump back 3 first, then another 4. Use ten as the stopping point.</p>	<p>16—8</p> <p>How many do we take off first to get to 10? How many left to take off?</p>
<p>Bar model</p>	 $5 - 2 = 3$		 $10 = 8 + 2$ $10 = 2 + 8$ $10 - 2 = 8$ $10 - 8 = 2$

Objective & Strategy	Concrete	Pictorial	Abstract
Regroup a ten into ten ones	 <p>Use a PV chart to show how to change a ten into ten ones, use the term 'take and make'</p>	 $20 - 4 =$	$20 - 4 = 16$
Partitioning to subtract without regrouping. <i>'Friendly numbers'</i>	$34 - 13 = 21$  <p>Use Dienes to show how to partition the number when subtracting without regrouping.</p>	<p>Children draw representations of Dienes and cross off.</p>  $43 - 21 = 22$	$43 - 21 = 22$
Make ten strategy <i>Progression should be crossing one ten, crossing more than one ten, crossing the hundreds.</i>	 $34 - 28$ <p>Use a bead bar or bead strings to model counting to next ten and the rest.</p>	 <p>Use a number line to count on to next ten and then the rest.</p>	$93 - 76 = 17$

Y2 SUBTRACTION -

Y3 SUBTRACTION -

Objective & Strategy	Concrete	Pictorial	Abstract
Column subtraction without regrouping (friendly numbers)	 <p>Use base 10 or Numicon to model</p>	 <p>Draw representations to support understanding</p>	$47 - 24 = 23$ $\begin{array}{r} 40 + 7 \\ - 20 + 4 \\ \hline 20 + 3 \end{array}$ <p>Intermediate step may be needed to lead to clear subtraction understanding.</p> 
Column subtraction with regrouping	 <p>Begin with base 10 or Numicon. Move to pv counters, modelling the exchange of a ten into ten ones. Use the phrase 'take and make' for exchange.</p>	 <p>Children may draw base ten or PV counters and cross off.</p>	 <p>Begin by partitioning into pv columns</p>  <p>Then move to formal method.</p>

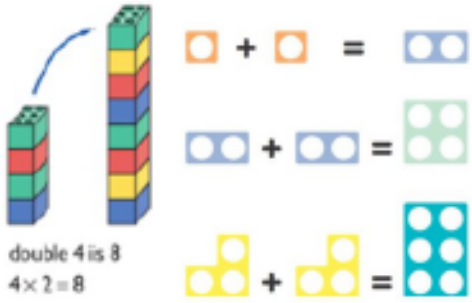

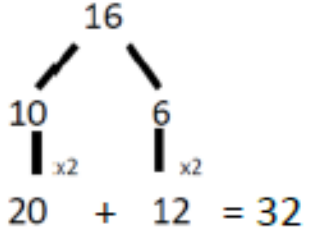
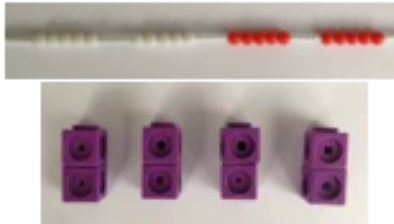

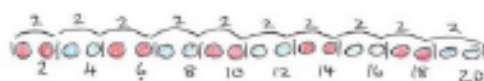



Objective & Strategy	Concrete	Pictorial	Abstract
Subtracting tens and ones Year 4 subtract with up to 4 digits. <i>Introduce decimal subtraction through context of money</i>	$234 - 179$  Model process of exchange using Numicon, base ten and then move to PV counters.	Children to draw pv counters and show their exchange—see Y3	 Use the phrase 'take and make' for exchange
Year 5- Subtract with at least 4 digits, including money and measures. <i>Subtract with decimal values, including mixtures of integers and decimals and aligning the decimal</i>	As Year 4	Children to draw pv counters and show their exchange—see Y3	 Use zeros for place-holders. 
Year 6—Subtract with increasingly large and more complex numbers and decimal values.			 

Y4-6

SUBTRACTION -

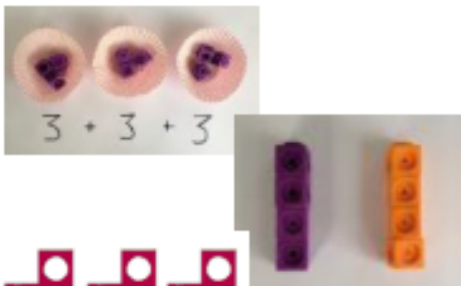
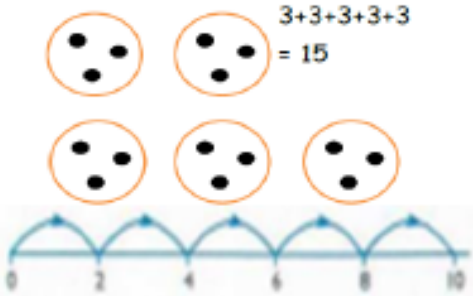
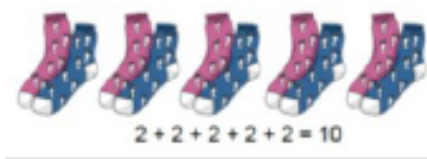
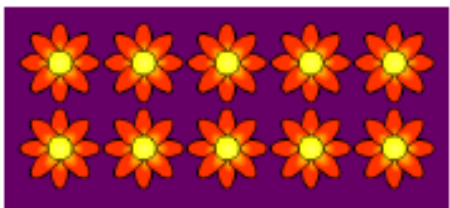
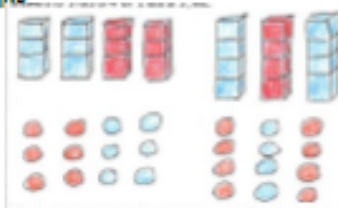
Y1

MULTIPLICATION X

Objective & Strategy	Concrete	Pictorial	Abstract
Doubling	<p>Use practical activities using manipulatives including cubes and Numicon to demonstrate doubling</p>  <p>double 4 is 8 $4 \times 2 = 8$</p>	<p>Draw pictures to show how to double numbers</p> <p>Double 4 is 8</p> 	<p>Partition a number and then double each part before recombining it back together.</p>  <p>$20 + 12 = 32$</p>
Counting in multiples	<p>Count the groups as children are skip counting, children may use their fingers as they are skip counting.</p> 	 <p>Children make representations to show counting in multiples.</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>
Making equal groups and counting the total	  <p>$\square \times \square = 8$</p> <p>Use manipulatives to create equal groups.</p>	<p>Draw  to show $2 \times 3 = 6$</p> <p>Draw and make representations</p>	<p>$2 \times 4 = 8$</p>

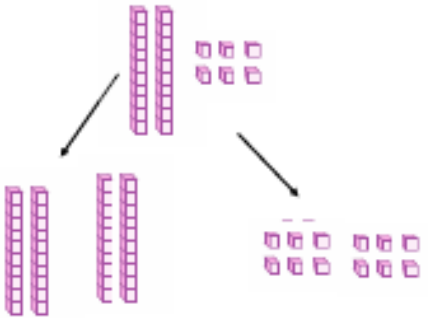
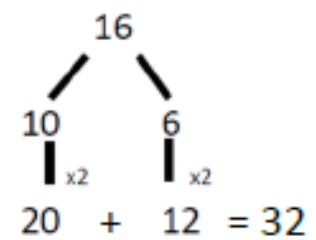


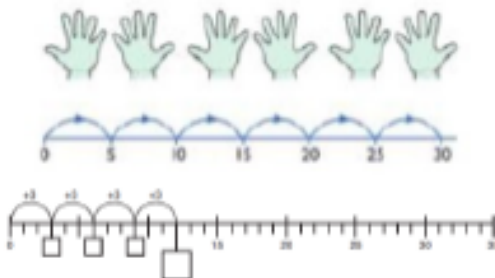
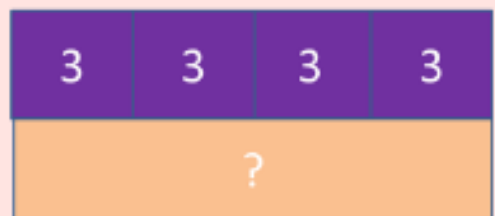
Y1

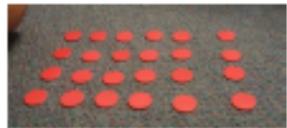




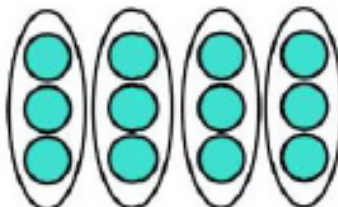
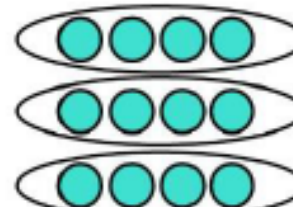



MULTIPLICATION X

Objective & Strategy	Concrete	Pictorial	Abstract
Repeated addition	 <p>Use different objects to add equal groups</p>	<p>Use pictorial including number lines to solve prob</p> <p>There are 3 sweets in one bag. How many sweets are in 5 bags altogether?</p>  $3 + 3 + 3 + 3 + 3 = 15$	<p>Write addition sentences to describe objects and pictures.</p>  $2 + 2 + 2 + 2 + 2 = 10$
Understanding arrays	<p>Use objects laid out in arrays to find the answers to 2 lots 5, 3 lots of 2 etc.</p> 	<p>Draw representations of arrays to show understanding.</p> 	$3 \times 2 = 6$ $2 \times 5 = 10$

Y2

MULTIPLICATION X

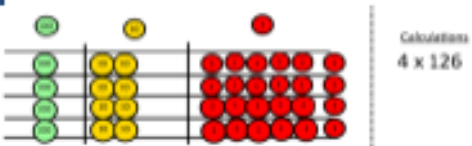

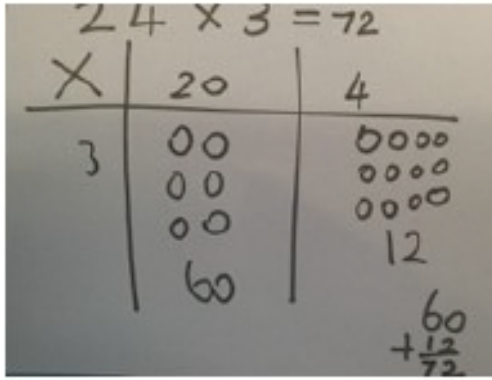
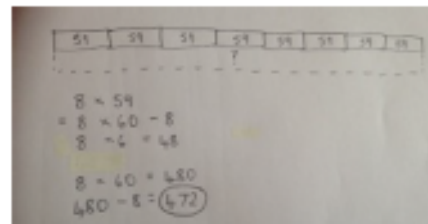
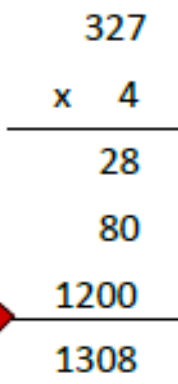
Objective & Strategy	Concrete	Pictorial	Abstract
Doubling	<p>Model doubling using dienes and PV counters.</p>  $40 + 12 = 52$	<p>Draw pictures and representations to show how to double numbers</p>	<p>Partition a number and then double each part before recombining it back together.</p>  $20 + 12 = 32$
Counting in multiples of 2, 3, 4, 5, 10 from 0 (repeated addition)	<p>Count the groups as children are skip counting, children may use their fingers as they are skip counting. Use bar models.</p>  $5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40$ 	<p>Number lines, counting sticks and bar models should be used to show representation of counting in multiples.</p>  	<p>Count in multiples of a number aloud.</p> <p>Write sequences with multiples of numbers.</p> <p>0, 2, 4, 6, 8, 10</p> <p>0, 3, 6, 9, 12, 15</p> <p>0, 5, 10, 15, 20, 25, 30</p> $4 \times 3 = \square$

Objective & Strategy	Concrete	Pictorial	Abstract																				
Multiplication is commutative	<p>Create arrays using counters and cubes and Numicon.</p>    <p>Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer.</p>  	<p>Use representations of arrays to show different calculations and explore commutativity.</p>  	<p>$12 = 3 \times 4$</p> <p>$12 = 4 \times 3$</p> <p>Use an array to write multiplication sentences and reinforce repeated addition.</p>  <p>$5 + 5 + 5 = 15$</p> <p>$3 + 3 + 3 + 3 + 3 = 15$</p> <p>$5 \times 3 = 15$</p> <p>$3 \times 5 = 15$</p>																				
Using the Inverse		 <table><tr><td><input type="text"/></td><td>\times</td><td><input type="text"/></td><td>$=$</td><td><input type="text"/></td></tr><tr><td><input type="text"/></td><td>\times</td><td><input type="text"/></td><td>$=$</td><td><input type="text"/></td></tr><tr><td><input type="text"/></td><td>\div</td><td><input type="text"/></td><td>$=$</td><td><input type="text"/></td></tr><tr><td><input type="text"/></td><td>\div</td><td><input type="text"/></td><td>$=$</td><td><input type="text"/></td></tr></table>	<input type="text"/>	\times	<input type="text"/>	$=$	<input type="text"/>	<input type="text"/>	\times	<input type="text"/>	$=$	<input type="text"/>	<input type="text"/>	\div	<input type="text"/>	$=$	<input type="text"/>	<input type="text"/>	\div	<input type="text"/>	$=$	<input type="text"/>	<p>$2 \times 4 = 8$</p> <p>$4 \times 2 = 8$</p> <p>$8 \div 2 = 4$</p> <p>$8 \div 4 = 2$</p> <p>$8 = 2 \times 4$</p> <p>$8 = 4 \times 2$</p> <p>$2 = 8 \div 4$</p> <p>$4 = 8 \div 2$</p> <p>Show all 8 related fact family sentences.</p>
<input type="text"/>	\times	<input type="text"/>	$=$	<input type="text"/>																			
<input type="text"/>	\times	<input type="text"/>	$=$	<input type="text"/>																			
<input type="text"/>	\div	<input type="text"/>	$=$	<input type="text"/>																			
<input type="text"/>	\div	<input type="text"/>	$=$	<input type="text"/>																			

Y3

MULTIPLICATION X

Objective & Strategy	Concrete	Pictorial	Abstract																																																																																											
Grid method	<p>Show the links with arrays to first introduce the grid method</p> <div><table><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></div> <p>Move onto base ten to move towards a more compact method.</p> <div><table><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></div> <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> <div><table><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></table><p>Calculations 4 x 126</p></div> <p>Fill each row with 126</p> <div><table><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></table><p>Calculations 4 x 126</p></div> <p>Add up each column, starting with the ones making any exchanges needed</p> <div><table><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></table><table><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></table></div> <p>Then you have your answer.</p>	x	10	3	4			x	T	U	4																																																																			<p>Children can represent their work 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 the circles in the different columns to show their thinking as shown below.</p> <p>Bar model are used to explore missing numbers</p>	<p>Start with multiplying by one digit numbers and showing the clear addition alongside the grid.</p> <table><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><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>	x	30	5	7	210	35		10	8	10	100	80	3	30	24
x	10	3																																																																																												
4																																																																																														
x	T	U																																																																																												
4																																																																																														
x	30	5																																																																																												
7	210	35																																																																																												
	10	8																																																																																												
10	100	80																																																																																												
3	30	24																																																																																												

Objective & Strategy	Concrete	Pictorial	Abstract																																
<p>Grid method recap from year 3 for 2 digits x 1 digit</p> <p>Move to multiplying 3 digit numbers by 1 digit. (year 4 expectation)</p>	<p>Use 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 4×126</p> <p>Fill each row with 126</p>  <p>Add up each col making any exchanges needed</p>	<p>Children can represent their work 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 the 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.</p> <table border="1" data-bbox="1543 373 1865 477"><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	30	5																																	
7	210	35																																	
Column multiplication	<p>Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. $321 \times 2 = 642$</p> <table border="1" data-bbox="412 1011 745 1402"><thead><tr><th>Hundreds</th><th>Tens</th><th>Ones</th></tr></thead><tbody><tr><td>3</td><td>2</td><td>1</td></tr><tr><td>3</td><td>2</td><td>1</td></tr><tr><td>3</td><td>2</td><td>1</td></tr><tr><td>3</td><td>2</td><td>1</td></tr></tbody></table> <p>It is important at this stage that they always multiply the ones first.</p> <p>The corresponding long multiplication is modelled alongside</p>	Hundreds	Tens	Ones	3	2	1	3	2	1	3	2	1	3	2	1	<p>The grid method may be used to show how this relates to a formal written method.</p> <table border="1" data-bbox="1016 892 1352 979"><tr><td>x</td><td>300</td><td>20</td><td>7</td></tr><tr><td>4</td><td>1200</td><td>80</td><td>28</td></tr></table>  <p>Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.</p>	x	300	20	7	4	1200	80	28	 <p>This may lead to a compact method.</p> <table border="1" data-bbox="1485 1283 1720 1466"><tr><td>x</td><td>3</td><td>2</td><td>7</td></tr><tr><td>4</td><td>1</td><td>3</td><td>0</td><td>8</td></tr></table>	x	3	2	7	4	1	3	0	8
Hundreds	Tens	Ones																																	
3	2	1																																	
3	2	1																																	
3	2	1																																	
3	2	1																																	
x	300	20	7																																
4	1200	80	28																																
x	3	2	7																																
4	1	3	0	8																															


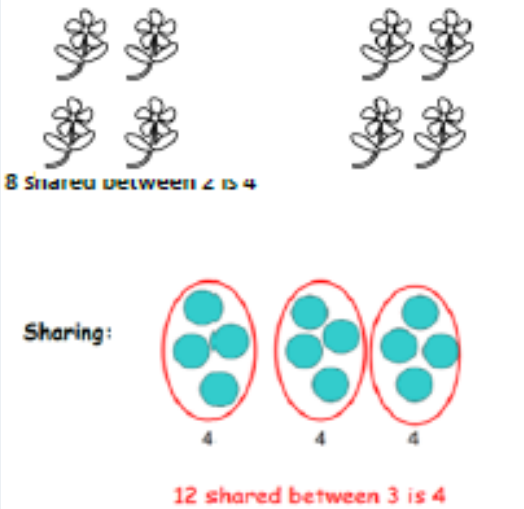
Y5-6

MULTIPLICATION X

Objective & Strategy	Concrete	Pictorial	Abstract																																																				
Column Multiplication for 3 and 4 digits x 1 digit.	<div><table><tr><th>Hundreds</th><th>Tens</th><th>Ones</th></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table><p>It is important at this stage that they always multiply the ones first.</p><p>Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. $321 \times 2 = 642$</p></div>	Hundreds	Tens	Ones													<table><tr><td>x</td><td>300</td><td>20</td><td>7</td></tr><tr><td>4</td><td>1200</td><td>80</td><td>28</td></tr></table>	x	300	20	7	4	1200	80	28	<div>$\begin{array}{r} 327 \\ \times 4 \\ \hline 28 \\ 80 \\ 1200 \\ \hline 1308 \end{array}$<table><tr><td></td><td>3</td><td>2</td><td>7</td></tr><tr><td>x</td><td></td><td></td><td>4</td></tr><tr><td></td><td>1</td><td>3</td><td>0</td></tr><tr><td></td><td></td><td>1</td><td>2</td></tr></table><p>This will lead to a compact method.</p></div>		3	2	7	x			4		1	3	0			1	2													
Hundreds	Tens	Ones																																																					
x	300	20	7																																																				
4	1200	80	28																																																				
	3	2	7																																																				
x			4																																																				
	1	3	0																																																				
		1	2																																																				
Column multiplication	Manipulatives may still be used with the corresponding long multiplication modelled alongside.	<div><table><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></div>		10	8	10	100	80	3	30	24	<div><table><tr><td></td><td>1</td><td>8</td></tr><tr><td>x</td><td>1</td><td>3</td></tr><tr><td></td><td>5</td><td>4</td></tr><tr><td></td><td>2</td><td></td></tr><tr><td>1</td><td>8</td><td>0</td></tr><tr><td>2</td><td>3</td><td>4</td></tr></table><p>18 x 3 on the first row (8 x 3 = 24, carrying the 2 for 20, then 1 x 3)</p><p>18 x 10 on the 2nd row. Show multiplying by 10 by putting zero in units first</p><div><table><tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>x</td><td></td><td></td><td>1</td><td>6</td></tr><tr><td></td><td>7</td><td>4</td><td>0</td><td>4</td></tr><tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td></td><td>1</td><td>9</td><td>7</td><td>4</td></tr></table><p>(1234 x 6) (1234 x 10)</p></div></div> <p>Continue to use bar modelling to support problem solving</p>		1	8	x	1	3		5	4		2		1	8	0	2	3	4		1	2	3	4	x			1	6		7	4	0	4		1	2	3	4		1	9	7	4
	10	8																																																					
10	100	80																																																					
3	30	24																																																					
	1	8																																																					
x	1	3																																																					
	5	4																																																					
	2																																																						
1	8	0																																																					
2	3	4																																																					
	1	2	3	4																																																			
x			1	6																																																			
	7	4	0	4																																																			
	1	2	3	4																																																			
	1	9	7	4																																																			

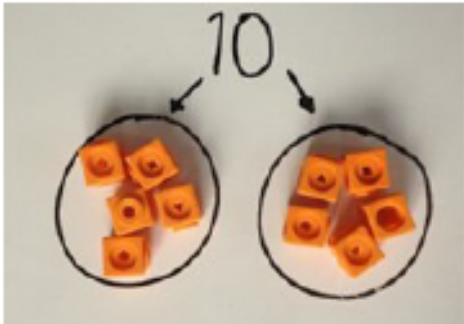
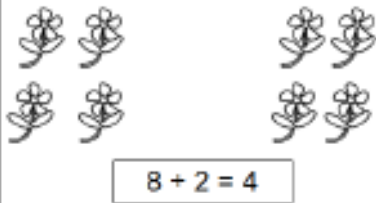
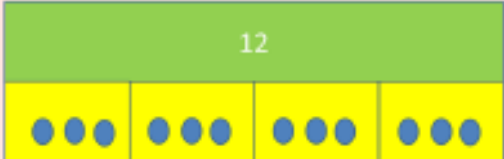


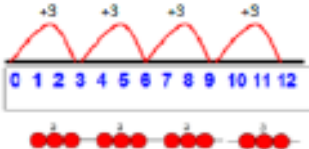
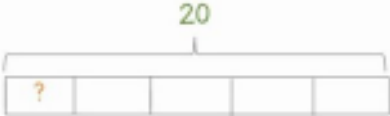
Y6 MULTIPLICATION X

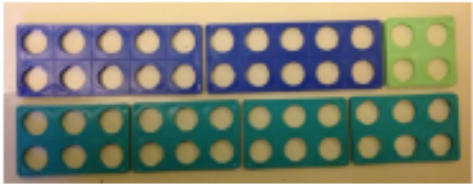

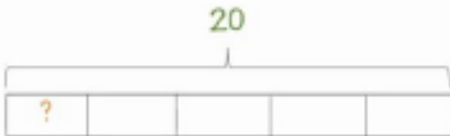

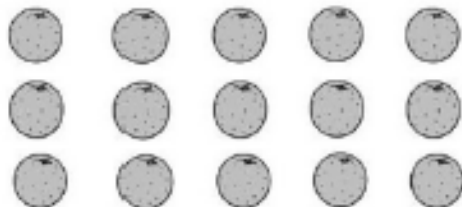
Objective & Strategy	Concrete	Pictorial	Abstract
<p>Multiplying decimals up to 2 decimal places by a single digit.</p>			<p>Remind children that the single digit belongs in the units column. Line up the decimal points in the question and the answer.</p> $ \begin{array}{r} 3.19 \\ \times 8 \\ \hline 25.52 \end{array} $

Objective & Strategy	Concrete	Pictorial	Abstract
<p>Division as sharing</p> <p>Use Gordon ITPs for modelling</p>	 <p>I have 10 cubes, can you share them equally in 2 groups?</p>	<p>Children use pictures or shapes to share quantities.</p>  <p>8 Shared between 2 is 4</p> <p>Sharing:</p> <p>12 shared between 3 is 4</p>	<p>12 shared between 3 is</p> <p>4</p>

Y2

DIVISION ÷

Objective & Strategy	Concrete	Pictorial	Abstract
Division as sharing	 <p>I have 10 cubes, can you share them equally in 2 groups?</p>	<p>Children use pictures or shapes to share quantities.</p>  <p>8 ÷ 2 = 4</p> <p>Children use bar modelling to show and support understanding.</p>  <p>12 ÷ 4 = 3</p>	$12 \div 3 = 4$
Division as grouping	<p>Divide quantities into equal groups.</p> <p>Use cubes, counters, objects or place value counters to aid understanding.</p>  	<p>Use number lines for grouping</p>  <p>12 ÷ 3 = 4</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>20 ÷ 5 = ? 5 x ? = 20</p>	$28 \div 7 = 4$ <p>Divide 28 into 7 groups. How many are in each group?</p>

Objective & Strategy	Concrete	Pictorial	Abstract
Division as grouping	<p>Use cubes, counters, objects or place value counters to aid understanding.</p>  <p>24 divided into groups of 6 = 4</p> $96 \div 3 = 32$ 	<p>Continue to use bar modelling to aid solving division problems.</p>  $20 \div 5 = ?$ $5 \times ? = 20$	<p>How many groups of 6 in 24?</p> $24 \div 6 = 4$
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 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 eight linking number sentences.</p> $7 \times 4 = 28$ $4 \times 7 = 28$ $28 \div 7 = 4$ $28 \div 4 = 7$ $28 = 7 \times 4$ $28 = 4 \times 7$ $4 = 28 \div 7$ $7 = 28 \div 4$

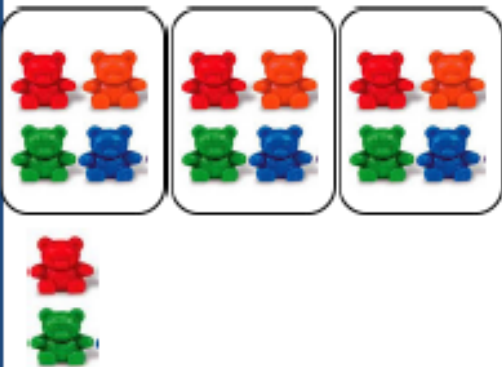


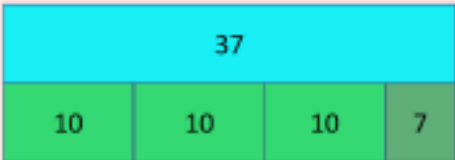
Y3

DIVISION



Y3

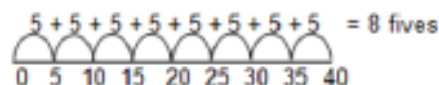
DIVISION ÷

Objective & Strategy	Concrete	Pictorial	Abstract
Division with remainders.	<p>$14 \div 3 =$</p> <p>Divide objects between groups and see how much is left over</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>Use bar models to show division with remainders.</p> 	<p>Complete written divisions and show the remainder using r.</p> $29 \div 8 = 3 \text{ REMAINDER } 5$ <p> <div>↑</div>dividend <div>↑</div>divisor <div>↑</div>quotient <div>↑</div>remainder </p>

Example without remainder:

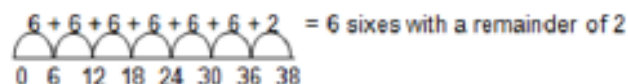
$$40 \div 5$$

Ask "How many 5s in 40?"



Example with remainder:

$$38 \div 6$$



For larger numbers, when it becomes inefficient to count in single multiples, bigger jumps can be recorded using known facts.

Y4-6

DIVISION ÷

Objective & Strategy	Concrete	Pictorial	Abstract						
Divide at least 3 digit numbers by 1 digit. Short Division	<p>$96 \div 3$</p> <table><tr><td></td><td>Tens</td><td>Units</td></tr><tr><td>3</td><td>3</td><td>2</td></tr></table> <p>Use place value counters to divide using the bus stop method alongside</p> <p>$42 \div 3 =$</p> <p>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.</p> <p>We exchange this ten for ten ones and then share the ones equally among the groups.</p> <p>We look how much in 1 group so the answer is 14.</p>		Tens	Units	3	3	2	<p>Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.</p> <p>Encourage them to move towards counting in multiples to divide more efficiently.</p>	<p>Begin with divisions that divide equally with no remainder.</p> $\begin{array}{r} 218 \\ 3 \overline{) 654} \end{array}$ <p>Move onto divisions with a remainder.</p> $\begin{array}{r} 86 \text{ r } 2 \\ 3 \overline{) 258} \end{array}$ <p>Finally move into decimal places to divide the total accurately.</p> $\begin{array}{r} 14.6 \\ 35 \overline{) 511.0} \end{array}$ $\begin{array}{r} 0663 \text{ r } 5 \\ 8 \overline{) 53029} \end{array}$
	Tens	Units							
3	3	2							

