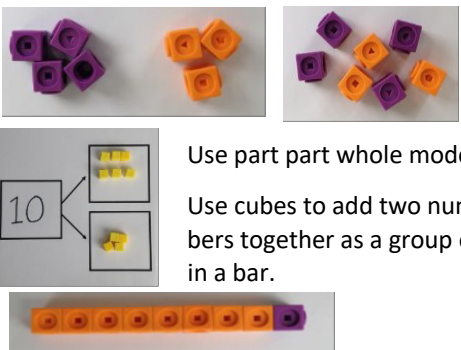
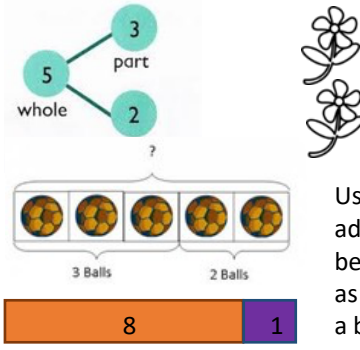
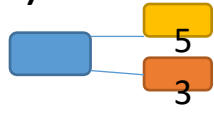

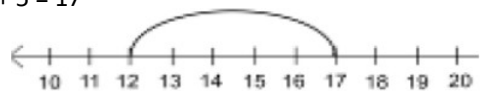
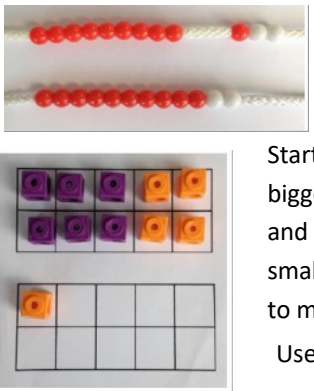
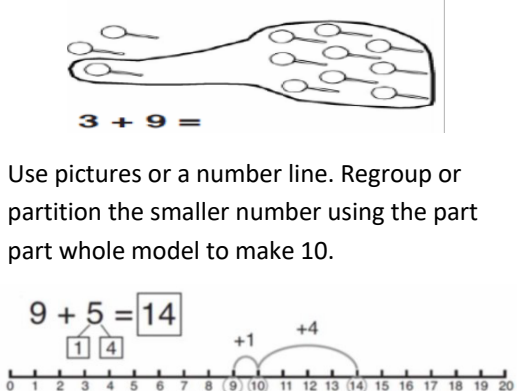

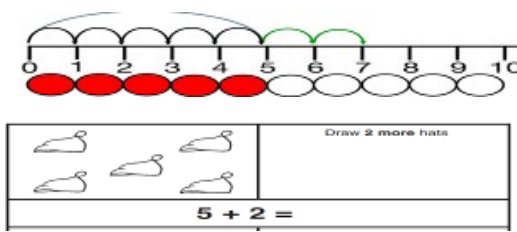

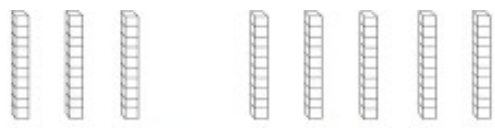
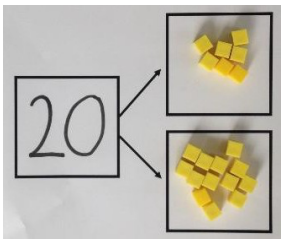
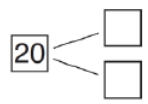
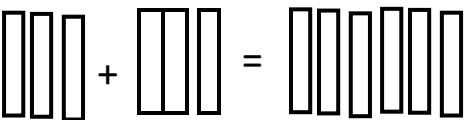


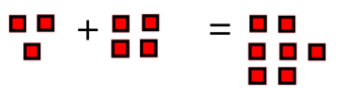
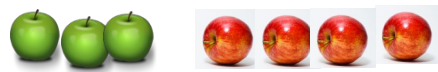
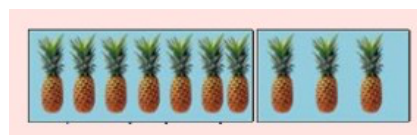
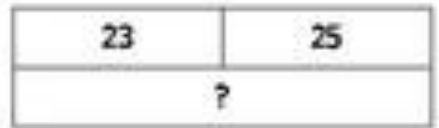


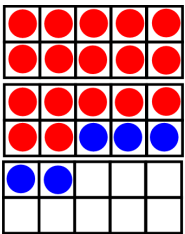
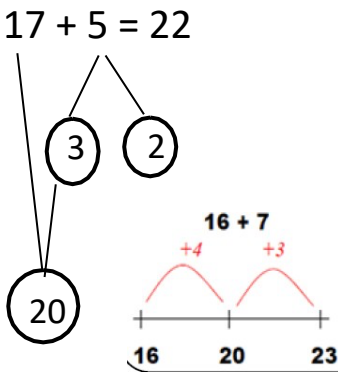
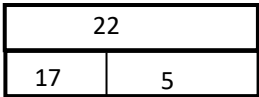
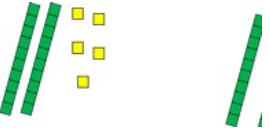
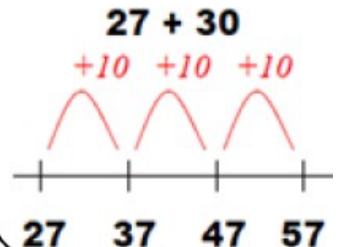
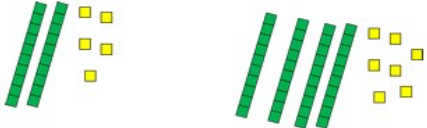
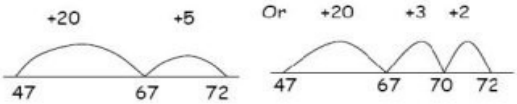
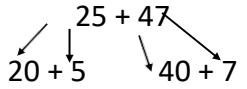
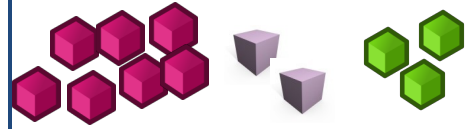




This policy has been largely adapted from the White Rose Maths Hub Calculation Policy with further material added. It is a working document and will be revised and amended as necessary.

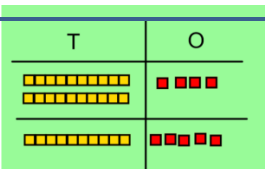
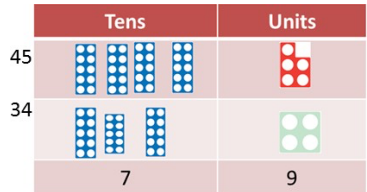
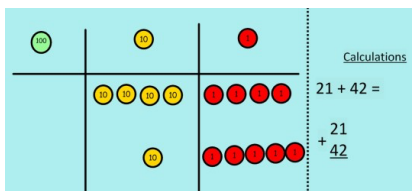
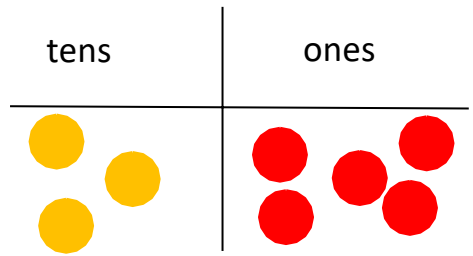
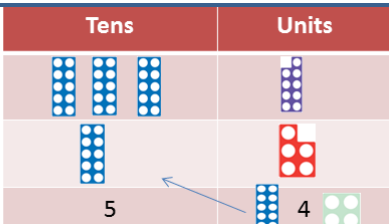
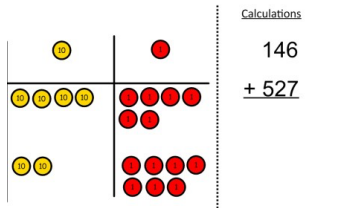
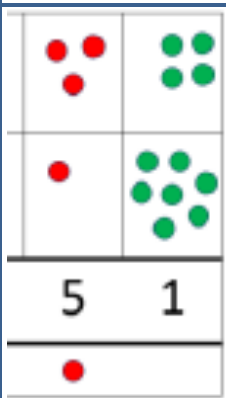
Objective & Strategy	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part- whole model	 <p>Use part part whole model.</p> <p>Use cubes to add two numbers together as a group or in a bar.</p>	 <p>Use pictures to add two numbers together as a group or in a bar.</p>	<p><math>4 + 3 = 7</math></p>  <p>Use the part-part whole diagram as shown above to move into the abstract.</p> <p><math>10 = 6 + 4</math></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><math>12 + 5 = 17</math></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><math>5 + 12 = 17</math></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><math>6 + 5 = 11</math></p> <p>Start with the bigger number and use the smaller number to make 10.</p> <p>Use ten frames.</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><math>9 + 5 = 14</math></p>	<p><math>7 + 4 = 11</math></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>Draw 2 more hats</p> <p><math>5 + 2 =</math></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>













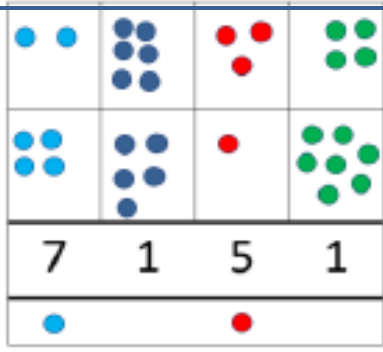












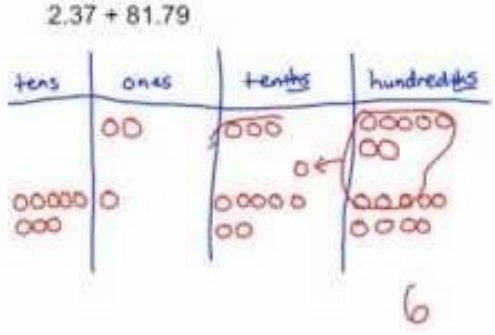



Objective & Strategy	Concrete	Pictorial	Abstract
Adding multiples of ten	$50 = 30 + 20$  Model using dienes and bead strings	 $3 \text{ tens} + 5 \text{ tens} = \underline{\hspace{2cm}} \text{ tens}$ $30 + 50 = \underline{\hspace{2cm}}$ Use representations for base ten.	$20 + 30 = 50$ $70 = 50 + 20$ $40 + \square = 60$
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	$\begin{array}{ c } \hline \square \\ \hline \square \end{array} + \begin{array}{ c } \hline \square \\ \hline \square \end{array} = \begin{array}{ c } \hline \square \square \\ \hline \square \square \end{array}$ 	   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	 $3 + 4 = 7$	 $7 + 3 = 10$	 $23 + 25 = 48$

# Y1 ADDITION +

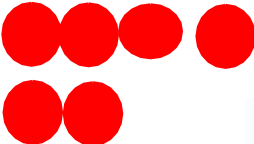

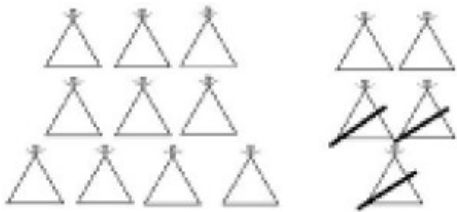



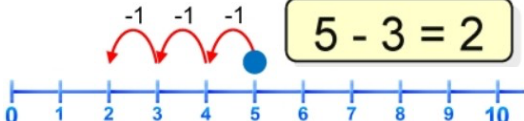
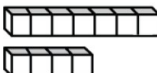
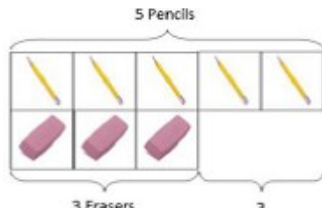
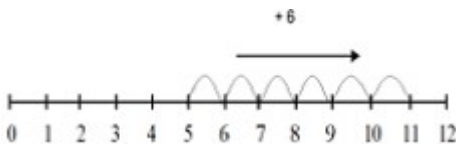
Objective & Strategy	Concrete	Pictorial	Abstract
Add a two digit number and ones	 <p> <math>17 + 5 = 22</math>                          Use ten frame to make 'magic ten'                     </p> <p>                         Children explore the pattern.  <math>17 + 5 = 22</math>  <math>27 + 5 = 32</math> </p>	<p> <math>17 + 5 = 22</math> </p> <p>                         Use part part whole and number line to model.                     </p> 	<p> <math>17 + 5 = 22</math> </p> <p>                         Explore related facts                     </p> <p> <math>17 + 5 = 22</math>  <math>5 + 17 = 22</math>  <math>22 - 17 = 5</math>  <math>22 - 5 = 17</math> </p> 
Add a 2 digit number and tens	 <p> <math>25 + 10 = 35</math>                          Explore that the ones digit does not change                     </p>	<p> <math>27 + 30</math> </p> 	<p> <math>27 + 10 = 37</math>  <math>27 + 20 = 47</math>  <math>27 + \square = 57</math> </p>
Add two 2-digit numbers	 <p>                         Model using dienes, place value counters and numicon                     </p>	 <p>                         Use number line and bridge ten using part whole if necessary.                     </p>	<p> <math>25 + 47</math> </p>  <p> <math>20 + 40 = 60</math>  <math>5 + 7 = 12</math>  <math>60 + 12 = 72</math> </p>
Add three 1-digit numbers	 <p>                         Combine to make 10 first if possible, or bridge 10 then add third digit                     </p>	 <p>                         Regroup and draw representation.                     </p>  <p> <math>= 15</math> </p>	<p> <math>4 + 7 + 6 = 10 + 7</math>  <math>= 17</math> </p> <p>                         Combine the two numbers that make/ bridge ten then add on the third.                     </p>



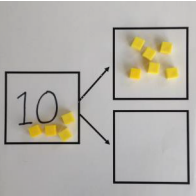
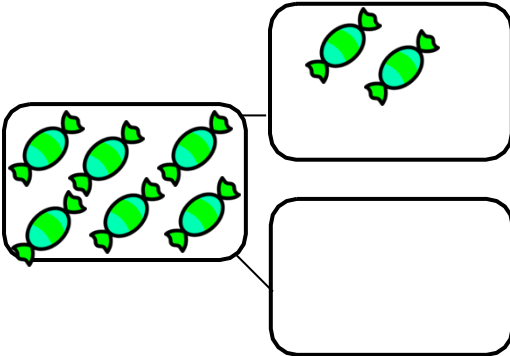
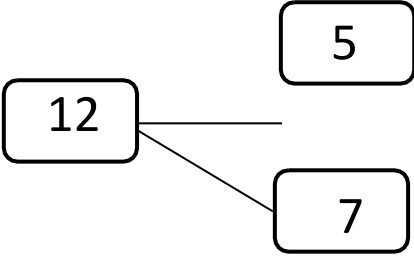
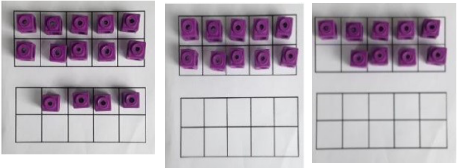
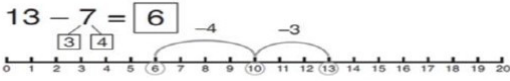
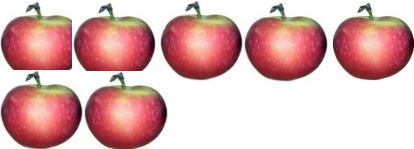


Objective & Strategy	Concrete	Pictorial	Abstract
<p>Column Addition—no regrouping (friendly numbers)</p> <p>Add two or three 2 or 3-digit numbers.</p>	<p>Model using Dienes or numicon</p>  <p>Add together the ones first, then the tens.</p>   <p>Move to using place value counters</p>	<p>Children move 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>Exchange ten ones for a ten. Model using numicon and pv counters.</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> $\begin{array}{r} 536 \\ + 85 \\ \hline 621 \\ 11 \end{array}$

Objective & Strategy	Concrete	Pictorial	Abstract																																																																		
Y4—add numbers with up to 4 digits	<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> <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></table>	Hundreds	Tens	Ones							 <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>																																																									
Hundreds	Tens	Ones																																																																			
																																																																					
																																																																					
Y5—add numbers with more than 4 digits.  Add decimals with 2 decimal places, including money.	<p>As year 4</p> <table><tr><th>tens</th><th>ones</th><th>tenths</th><th>hundredths</th></tr><tr><td></td><td></td><td></td><td></td></tr></table> <p>Introduce decimal place value counters and model exchange for addition.</p>	tens	ones	tenths	hundredths						<p>72.8</p> <p>+ 54.6</p> <p><u>127.4</u></p> <p>11</p> <table><tr><td>£</td><td>23</td><td>59</td></tr><tr><td>+</td><td>£</td><td>755</td></tr><tr><td>£</td><td>31</td><td>14</td></tr></table>	£	23	59	+	£	755	£	31	14																																																	
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Y6—add several numbers of increasing complexity  Including adding money, measure and decimals with different numbers of decimal points.	As Y5	As Y5	<table><tr><td>8</td><td>1</td><td>0</td><td>5</td><td>9</td></tr><tr><td></td><td>3</td><td>6</td><td>6</td><td>8</td></tr><tr><td></td><td>1</td><td>5</td><td>3</td><td>0</td></tr><tr><td>+</td><td>2</td><td>0</td><td>5</td><td>5</td></tr><tr><td></td><td>1</td><td>2</td><td>0</td><td>5</td></tr><tr><td></td><td>1</td><td>1</td><td>1</td><td>1</td></tr></table> <p>Insert zeros for place holders.</p> <table><tr><td></td><td>2</td><td>3</td><td>3</td><td>6</td><td>1</td></tr><tr><td></td><td></td><td>9</td><td>0</td><td>8</td><td>0</td></tr><tr><td></td><td></td><td>5</td><td>9</td><td>7</td><td>7</td></tr><tr><td>+</td><td></td><td>1</td><td>3</td><td>0</td><td>0</td></tr><tr><td></td><td>9</td><td>3</td><td>5</td><td>1</td><td>1</td></tr><tr><td></td><td>2</td><td>1</td><td>2</td><td></td><td></td></tr></table>	8	1	0	5	9		3	6	6	8		1	5	3	0	+	2	0	5	5		1	2	0	5		1	1	1	1		2	3	3	6	1			9	0	8	0			5	9	7	7	+		1	3	0	0		9	3	5	1	1		2	1	2		
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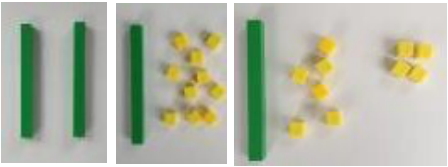
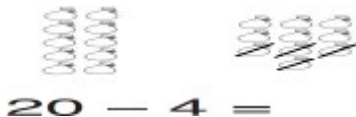
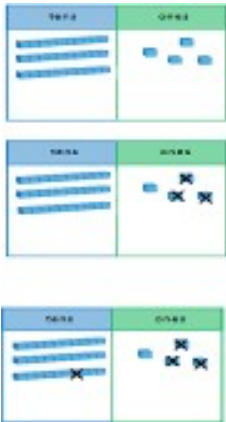
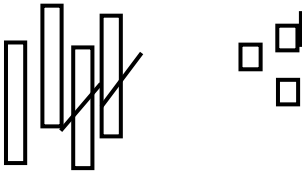
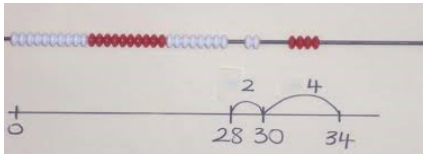
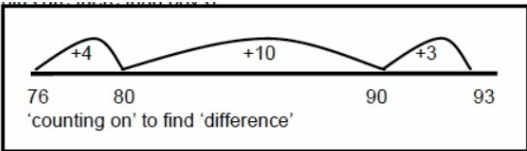
# Y4-6 ADDITION +

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

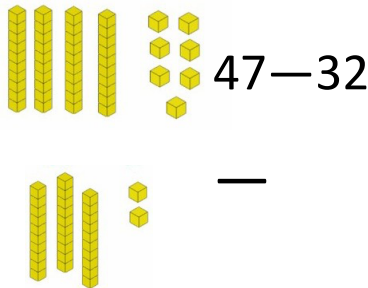
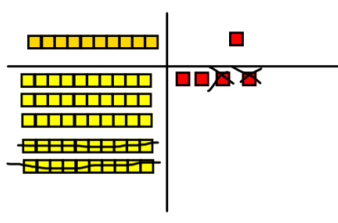
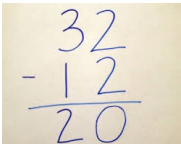
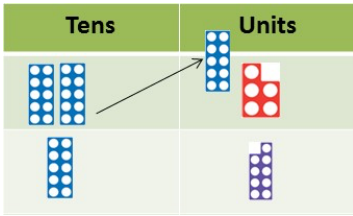
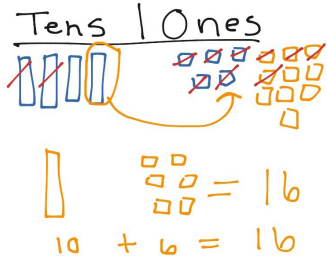
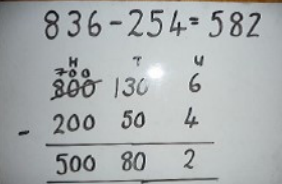
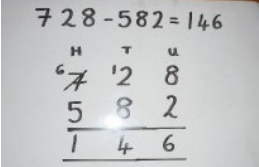
# Y1 SUBTRACTION

Objective & Strategy	Concrete	Pictorial	Abstract
<p><b>Represent and use number bonds and related subtraction facts within 20</b></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><math>14 - 9</math></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><math>13 - 7</math></p>  <p>Jump back 3 first, then another 4. Use ten as the stopping point.</p>	<p><math>16 - 8</math></p> <p>How many do we take off first to get to 10? How many left to take off?</p>
<p>Bar model</p>	 $5 - 2 = 3$		 $10 = 8 + 2$ $10 = 2 + 8$ $10 - 2 = 8$ $10 - 8 = 2$

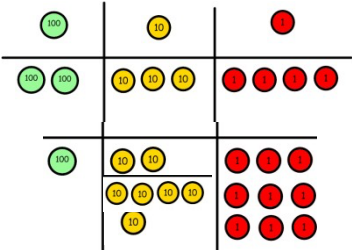
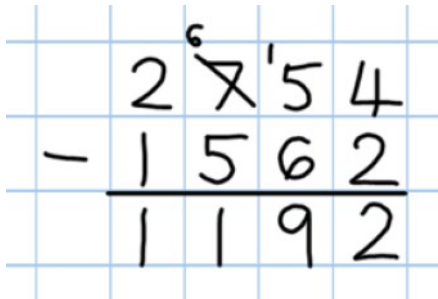
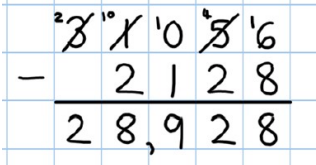
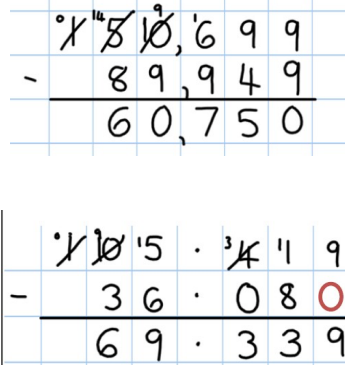
# Y1 SUBTRACTION -

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>	$93 - 76 = 17$

# Y1 SUBTRACTION -

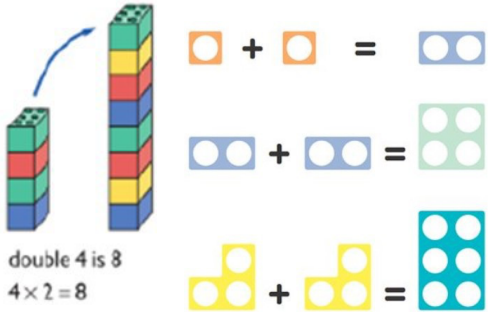

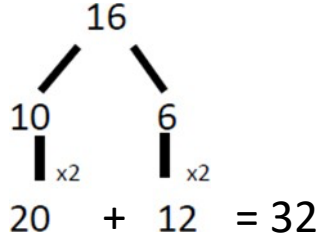
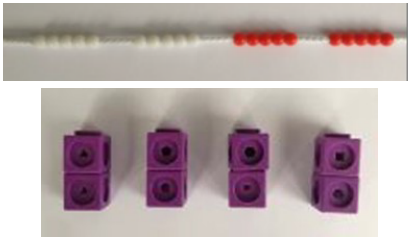
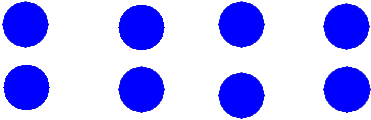
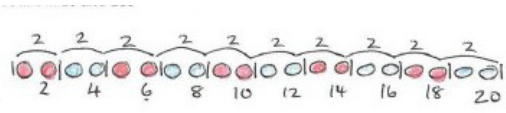
Objective & Strategy	Concrete	Pictorial	Abstract
Column subtraction without regrouping (friendly numbers)	 $47 - 32$ <p>Use base 10 or Numicon to model</p>	 <p>Calculations</p> $\begin{array}{r} 54 \\ - 22 \\ \hline 32 \end{array}$ <p>Draw representations to support understanding</p>	$47 - 24 = 23$ $\begin{array}{r} 40 + 7 \\ - 20 + 4 \\ \hline 20 + 3 \end{array}$ <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>	$\begin{array}{r} 45 \\ - 29 \\ \hline 16 \end{array}$ <p>Tens   Ones</p>  <p>Children may draw base ten or PV counters and cross off.</p>	$836 - 254 = 582$  <p>Begin by partitioning into pv columns</p> $728 - 582 = 146$  <p>Then move to formal method.</p>

# Y1 SUBTRACTION -

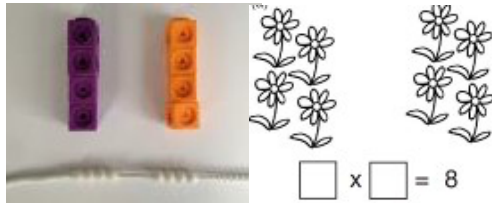
Objective & Strategy	Concrete	Pictorial	Abstract
<p>Subtracting tens and ones</p> <p>Year 4 subtract with up to 4 digits.</p> <p><i>Introduce decimal subtraction through context of money</i></p>	<p>234 - 179</p>  <p>Model process of exchange using Numicon, base ten and then move to PV counters.</p>	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

# Y4-6 SUBTRACTION




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 <math>4 \times 2 = 8</math></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><math>16</math> <math>10</math> and <math>6</math> <math>10 \times 2 = 20</math> <math>6 \times 2 = 12</math> <math>20 + 12 = 32</math></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



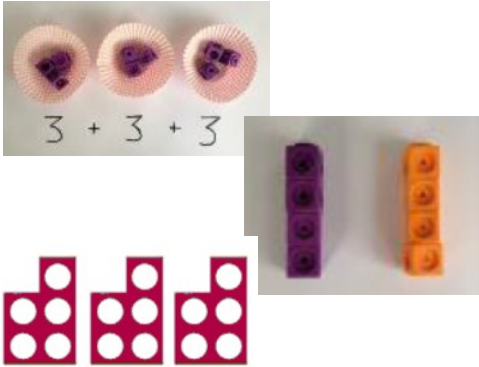
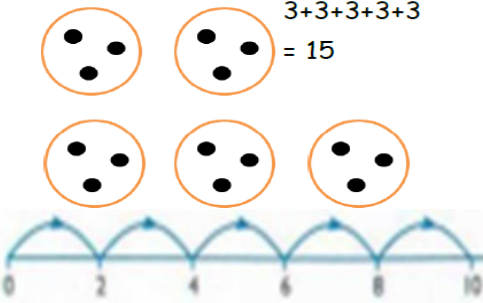

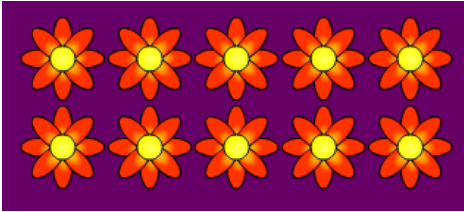
Use manipulatives to create equal groups.

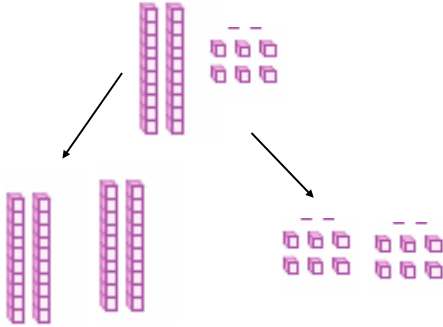
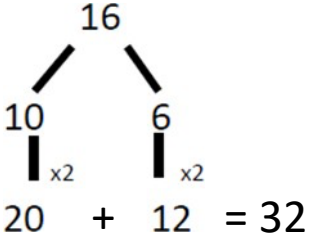


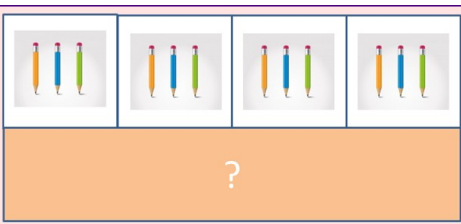

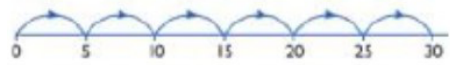
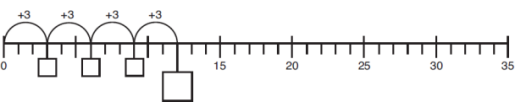
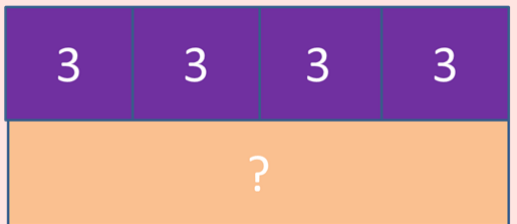
Draw  to show  $2 \times 3 = 6$


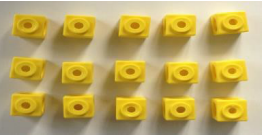
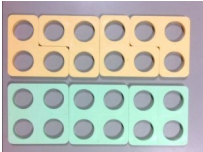
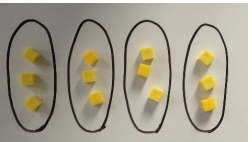
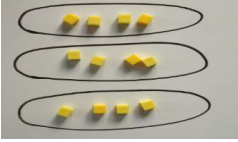
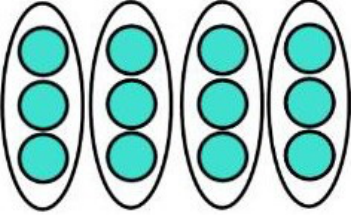
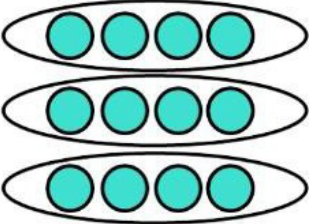


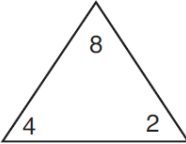
Draw and make representations

$$2 \times 4 = 8$$



Objective & Strategy	Concrete	Pictorial	Abstract
Repeated addition	 <p>Use different objects to add equal groups</p>	<p>Use pictorial including number lines to solve problems.</p> <p>There are 3 sweets in one bag. How many sweets are in 5 bags altogether?</p> 	<p>Write addition sentences to describe objects and pictures.</p> 
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>	$3 \times 2 = 6$ $2 \times 5 = 10$

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>  $16 \begin{matrix} \swarrow & \searrow \\ 10 & 6 \end{matrix} \begin{matrix} \downarrow \times 2 & \downarrow \times 2 \\ 20 & 12 \end{matrix} \quad + \quad = 32$
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
<p>Multiplication is commutative</p>	<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><math>12 = 3 \times 4</math></p> <p><math>12 = 4 \times 3</math></p> <p>Use an array to write multiplication sentences and reinforce repeated addition.</p>  <p><math>5 + 5 + 5 = 15</math></p> <p><math>3 + 3 + 3 + 3 + 3 = 15</math></p> <p><math>5 \times 3 = 15</math></p> <p><math>3 \times 5 = 15</math></p>
<p>Using the Inverse</p> <p><i>This should be taught alongside division, so pupils learn how they work alongside each other.</i></p>		 <p><math>\square \times \square = \square</math></p> <p><math>\square \times \square = \square</math></p> <p><math>\square \div \square = \square</math></p> <p><math>\square \div \square = \square</math></p>	<p><math>2 \times 4 = 8</math></p> <p><math>4 \times 2 = 8</math></p> <p><math>8 \div 2 = 4</math></p> <p><math>8 \div 4 = 2</math></p> <p><math>8 = 2 \times 4</math></p> <p><math>8 = 4 \times 2</math></p> <p><math>2 = 8 \div 4</math></p> <p><math>4 = 8 \div 2</math></p> <p>Show all 8 related fact family sentences.</p>

# Y2 MULTIPLICATION X

Objective & Strategy	Concrete	Pictorial	Abstract
Grid method	<p>Show the links with arrays to first introduce the grid method.</p> <div><div><div><div>x</div><div>10</div><div>3</div></div><div><div>4</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></di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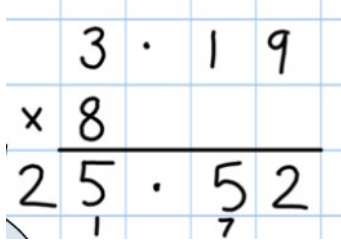
Objective & Strategy	Concrete	Pictorial	Abstract																							
<p>Grid method recap from year 3 for 2 digits x 1 digit</p> <p>Move to multiplying 3 digit numbers by 1 digit. (year 4 expectation)</p>	<p>Use place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows</p> <div><div><div>100</div><div>10</div><div>1</div></div><div><div>100</div><div>10</div><div>1</div></div><div><div>100</div><div>10</div><div>1</div></div><div><div>100</div><div>10</div><div>1</div></div></div> <div>Calculations 4 x 126</div> <p>Fill each row with 126</p> <div><div><div>100</div><div>10</div><div>1</div></div><div><div>100</div><div>10</div><div>1</div></div><div><div>100</div><div>10</div><div>1</div></div><div><div>100</div><div>10</div><div>1</div></div></div> <p>Add up each column, starting with the ones, 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><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																								
<p>Column multiplication</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 x 2 = 642</p> <table><tr><th>Hundreds</th><th>Tens</th><th>Ones</th></tr><tr><td><div><div>100</div><div>100</div><div>100</div></div></td><td><div><div>10</div><div>10</div></div></td><td><div><div>1</div><div>1</div><div>1</div></div></td></tr><tr><td><div><div>100</div><div>100</div><div>100</div></div></td><td><div><div>10</div><div>10</div></div></td><td><div><div>1</div><div>1</div><div>1</div></div></td></tr><tr><td><div><div>100</div><div>100</div><div>100</div></div></td><td><div><div>10</div><div>10</div></div></td><td><div><div>1</div><div>1</div><div>1</div></div></td></tr><tr><td><div><div>100</div><div>100</div><div>100</div></div></td><td><div><div>10</div><div>10</div></div></td><td><div><div>1</div><div>1</div><div>1</div></div></td></tr></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	<div><div>100</div><div>100</div><div>100</div></div>	<div><div>10</div><div>10</div></div>	<div><div>1</div><div>1</div><div>1</div></div>	<div><div>100</div><div>100</div><div>100</div></div>	<div><div>10</div><div>10</div></div>	<div><div>1</div><div>1</div><div>1</div></div>	<div><div>100</div><div>100</div><div>100</div></div>	<div><div>10</div><div>10</div></div>	<div><div>1</div><div>1</div><div>1</div></div>	<div><div>100</div><div>100</div><div>100</div></div>	<div><div>10</div><div>10</div></div>	<div><div>1</div><div>1</div><div>1</div></div>	<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> <p>The grid method may be used to show how this relates to a formal written method.</p> <div><div><div>59</div><div>59</div><div>59</div><div>59</div><div>59</div><div>59</div><div>59</div><div>59</div></div><div><div>8 x 59</div><div>= 8 x 60 - 8</div><div>8 x 6 = 48</div><div>8 x 60 = 480</div><div>480 - 8 = 472</div></div></div> <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	<div><div>327</div><div>x 4</div><div>28</div><div>80</div><div>1200</div><div>1308</div></div> <p>This may lead to a compact method.</p>
Hundreds	Tens	Ones																								
<div><div>100</div><div>100</div><div>100</div></div>	<div><div>10</div><div>10</div></div>	<div><div>1</div><div>1</div><div>1</div></div>																								
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# Y4 MULTIPLICATION


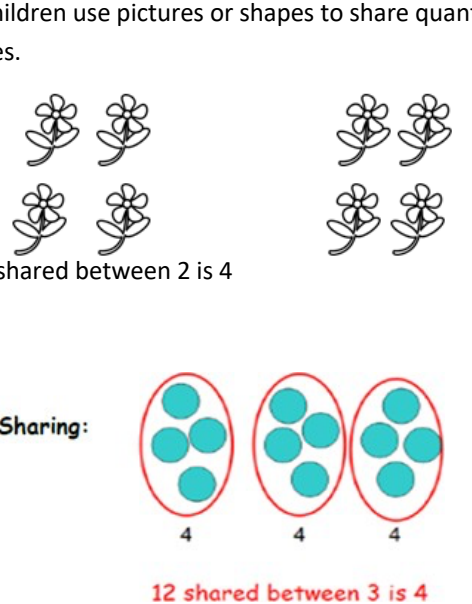


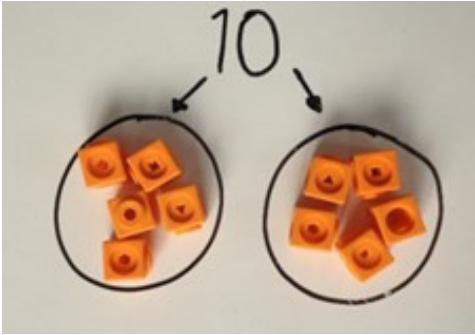
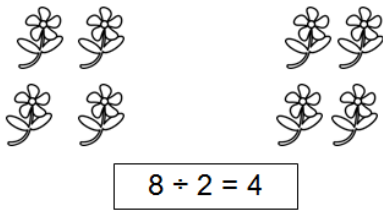
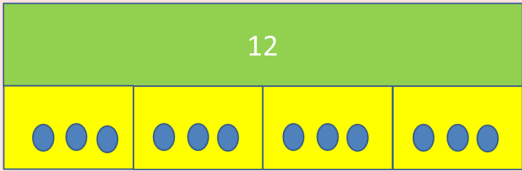
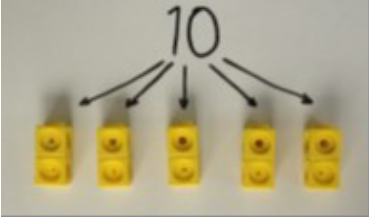
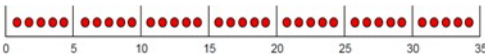
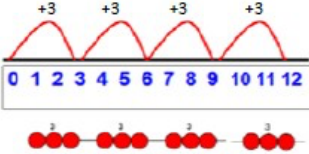
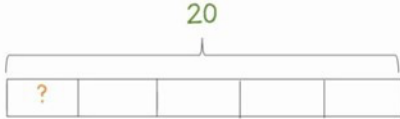
Objective & Strategy	Concrete	Pictorial	Abstract																																																	
Column Multiplication for 3 and 4 digits x 1 digit.	<div><table><tr><th>Hundreds</th><th>Tens</th><th>Ones</th></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></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. <math>321 \times 2 = 642</math></p></div>	Hundreds	Tens	Ones													<div><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></div>	x	300	20	7	4	1200	80	28	<div><math display="block">\begin{array}{r} 327 \\ \times 4 \\ \hline 28 \\ 80 \\ 1200 \\ \hline 1308 \end{array}</math><div><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>2</td><td></td></tr></table></div><p>This will lead to a compact method.</p></div>		3	2	7	x			4		1	3	0			2											
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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> <p>Continue to use bar modelling to support problem solving</p>		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>1</td><td>8</td></tr><tr><td></td><td>2</td><td>3</td></tr></table><p>18 x 3 on the first row (8 x 3 = 24, carrying the 2 for 20, then 1 x 3) 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>		1	8	x	1	3		5	4		1	8		2	3		1	2	3	4	x			1	6		7	4	0	4		1	2	3	4		1	9	7	4
	10	8																																																		
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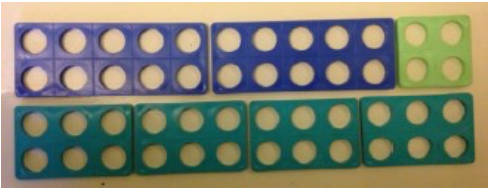

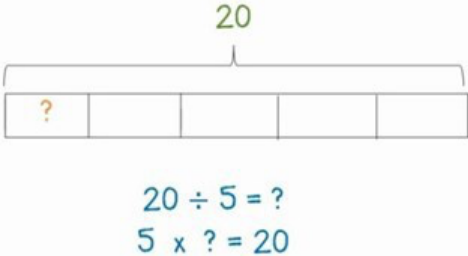
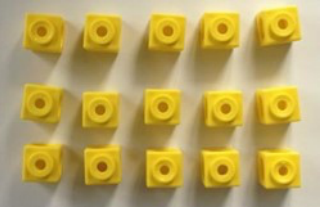
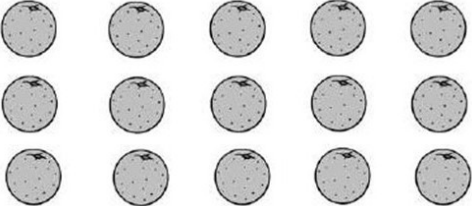
Y5-6  
MULTIPLICATION

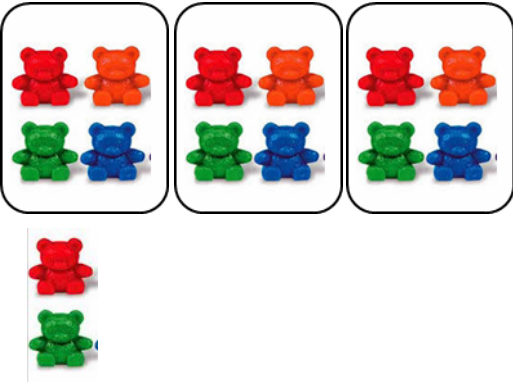
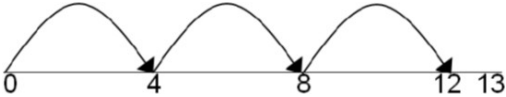

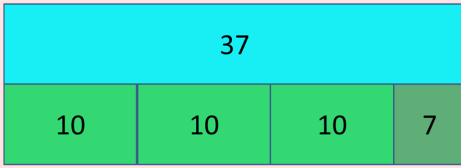
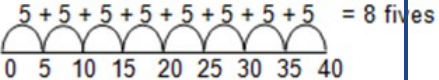
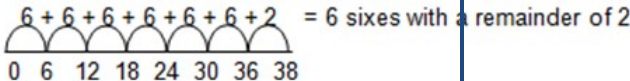
Objective & Strategy	Concrete	Pictorial	Abstract
<p>Multiplying decimals up to 2 decimal places by a single digit.</p>			<p>Remind children that the single digit belongs in the units column. Line up the decimal points in the question and the answer.</p> 

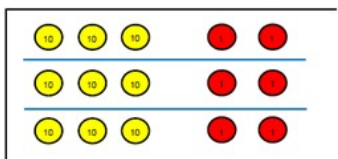



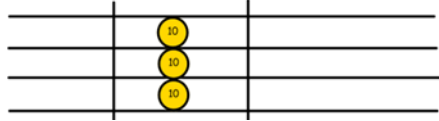
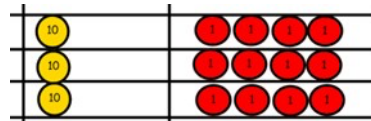
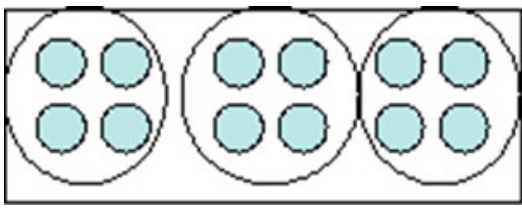
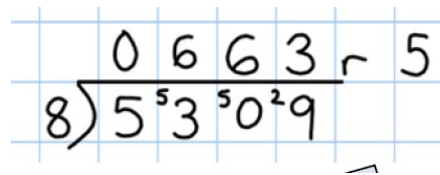
# Y6 MULTIPLICATION X

Objective & Strategy	Concrete	Pictorial	Abstract
<p>Division as sharing</p> <p><i>Use Gordon ITPs for modelling</i></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: 4 4 4</p> <p>12 shared between 3 is 4</p>	<p>12 shared between 3 is</p> <p>4</p>

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>  $8 \div 2 = 4$ <p>Children use bar modelling to show and support understanding.</p>  $12 \div 4 = 3$	$12 \div 3 = 4$
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>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>  $20 \div 5 = ?$ $5 \times ? = 20$	$28 \div 7 = 4$ <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> 	<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 <math>15 \div 3 = 5</math>    <math>5 \times 3 = 15</math></p> <p><math>15 \div 5 = 3</math>    <math>3 \times 5 = 15</math></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> $7 \times 4 = 28$ $4 \times 7 = 28$ $28 \div 7 = 4$ $28 \div 4 = 7$ $28 = 7 \times 4$ $28 = 4 \times 7$ $4 = 28 \div 7$ $7 = 28 \div 4$

Objective & Strategy	Concrete	Pictorial	Abstract
Division with remainders.	<p> <math>14 \div 3 =</math>                      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> <b>Example without remainder:</b>  <math>40 \div 5</math>                      Ask "How many 5s in 40?"                 </p>  <p> <b>Example with remainder:</b>  <math>38 \div 6</math> </p>  <p>                     For larger numbers, when it becomes inefficient to count in single multiples, bigger jumps can be recorded using known facts.                 </p>	<p>                     Complete written divisions and show the remainder using r.                 </p> <p> <math>29 \div 8 = 3 \text{ REMAINDER } 5</math> </p> <p>                     ↑   ↑   ↑   ↑                      dividend   divisor   quotient   remainder                 </p>

Objective & Strategy	Concrete	Pictorial	Abstract
<p>Divide at least 3 digit numbers by 1 digit.</p> <p>Short Division</p>	<p><math>96 \div 3</math></p> <p>Tens      Units</p> <p>3              2</p>  <p>Use place value counters to divide using the bus stop method alongside</p>  <p>Calculations <math>42 \div 3</math></p>  <p><math>42 \div 3 =</math></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>	<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> $\begin{array}{r} 86 \text{ r } 2 \\ 3 \overline{) 432} \end{array}$ <p>Finally move into decimal places to divide the total accurately.</p> $\begin{array}{r} 14.6 \\ 35 \overline{) 511.0} \end{array}$ 



## Long Division

Step 1—a remainder in the ones

$$\begin{array}{r} \text{h t o} \\ 041\text{ R}1 \\ \hline 4 \overline{) 165} \end{array}$$

4 does not go into 1 (hundred). So combine the 1 hundred with the 6 tens (160).

4 goes into 16 four times.

4 goes into 5 once, leaving a remainder of 1.

$$\begin{array}{r} \text{th h t o} \\ 0400\text{ R}7 \\ \hline 8 \overline{) 3207} \end{array}$$

8 does not go into 3 of the thousands. So combine the 3 thousands with the 2 hundreds (3,200).

8 goes into 32 four times ( $3,200 \div 8 = 400$ )

8 goes into 0 zero times (tens).

8 goes into 7 zero times, and leaves a remainder of 7.

## Long Division

Step 1 continued...

$$\begin{array}{r}
 \text{h t o} \\
 061 \\
 4 \overline{) 247} \\
 \underline{-4} \\
 3
 \end{array}$$

When dividing the ones, 4 goes into 7 one time. Multiply  $1 \times 4 = 4$ , write that four under the 7, and subtract. This finds us the remainder of 3.

Check:  $4 \times 61 + 3 = 247$

$$\begin{array}{r}
 \text{th h t o} \\
 0402 \\
 4 \overline{) 1609} \\
 \underline{-8} \\
 1
 \end{array}$$

When dividing the ones, 4 goes into 9 two times. Multiply  $2 \times 4 = 8$ , write that eight under the 9, and subtract. This finds us the remainder of 1.

Check:  $4 \times 402 + 1 = 1,609$

## Long Division

Step 2—a remainder in the tens

1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
$\begin{array}{r} \text{t o} \\ 2 \overline{) 58} \end{array}$ <p>Two goes into 5 two times, or 5 tens <math>\div 2 = 2</math> whole tens -- but there is a remainder!</p>	$\begin{array}{r} \text{t o} \\ 2 \overline{) 58} \\ -4 \\ \hline 1 \end{array}$ <p>To find it, multiply <math>2 \times 2 = 4</math>, write that 4 under the five, and subtract to find the remainder of 1 ten.</p>	$\begin{array}{r} \text{t o} \\ 29 \\ 2 \overline{) 58} \\ -4 \downarrow \\ \hline 18 \end{array}$ <p>Next, drop down the 8 of the ones next to the leftover 1 ten. You combine the remainder ten with 8 ones, and get 18.</p>
1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
$\begin{array}{r} \text{t o} \\ 29 \\ 2 \overline{) 58} \\ -4 \\ \hline 18 \end{array}$ <p>Divide 2 into 18. Place 9 into the quotient.</p>	$\begin{array}{r} \text{t o} \\ 29 \\ 2 \overline{) 58} \\ -4 \\ \hline 18 \\ -18 \\ \hline 0 \end{array}$ <p>Multiply <math>9 \times 2 = 18</math>, write that 18 under the 18, and subtract.</p>	$\begin{array}{r} \text{t o} \\ 29 \\ 2 \overline{) 58} \\ -4 \\ \hline 18 \\ -18 \\ \hline 0 \end{array}$ <p>The division is over since there are no more digits in the dividend. The quotient is 29.</p>

Y6  
DIVISION

## Long Division

Step 2—a remainder in any of the place values

1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
$\begin{array}{r} \text{h t o} \\ 1 \\ 2 \overline{) 278} \end{array}$ <p>Two goes into 2 one time, or 2 hundreds <math>\div 2 = 1</math> hundred.</p>	$\begin{array}{r} \text{h t o} \\ 1 \\ 2 \overline{) 278} \\ -2 \\ \hline 0 \end{array}$ <p>Multiply <math>1 \times 2 = 2</math>, write that 2 under the two, and subtract to find the remainder of zero.</p>	$\begin{array}{r} \text{h t o} \\ 18 \\ 2 \overline{) 278} \\ -2 \\ \hline 07 \end{array}$ <p>Next, drop down the 7 of the tens next to the zero.</p>
Divide.	Multiply & subtract.	Drop down the next digit.
$\begin{array}{r} \text{h t o} \\ 13 \\ 2 \overline{) 278} \\ -2 \\ \hline 07 \end{array}$ <p>Divide 2 into 7. Place 3 into the quotient.</p>	$\begin{array}{r} \text{h t o} \\ 13 \\ 2 \overline{) 278} \\ -2 \\ \hline 07 \\ -6 \\ \hline 1 \end{array}$ <p>Multiply <math>3 \times 2 = 6</math>, write that 6 under the 7, and subtract to find the remainder of 1 ten.</p>	$\begin{array}{r} \text{h t o} \\ 13 \\ 2 \overline{) 278} \\ -2 \\ \hline 07 \\ -6 \\ \hline 18 \end{array}$ <p>Next, drop down the 8 of the ones next to the 1 leftover ten.</p>
1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
$\begin{array}{r} \text{h t o} \\ 139 \\ 2 \overline{) 278} \\ -2 \\ \hline 07 \\ -6 \\ \hline 18 \end{array}$ <p>Divide 2 into 18. Place 9 into the quotient.</p>	$\begin{array}{r} \text{h t o} \\ 139 \\ 2 \overline{) 278} \\ -2 \\ \hline 07 \\ -6 \\ \hline 18 \\ -18 \\ \hline 0 \end{array}$ <p>Multiply <math>9 \times 2 = 18</math>, write that 18 under the 18, and subtract to find the remainder of zero.</p>	$\begin{array}{r} \text{h t o} \\ 139 \\ 2 \overline{) 278} \\ -2 \\ \hline 07 \\ -6 \\ \hline 18 \\ -18 \\ \hline 0 \end{array}$ <p>There are no more digits to drop down. The quotient is 139.</p>

Y6  
DIVISION