
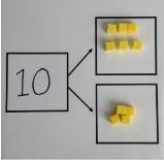

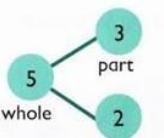

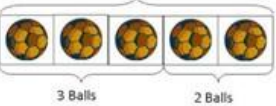

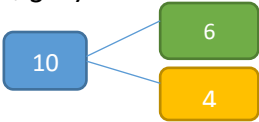

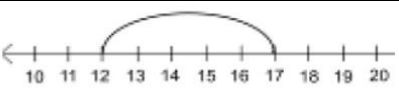


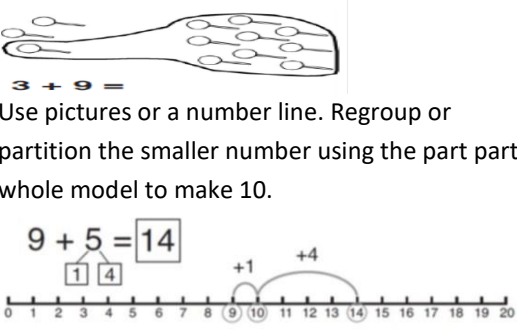

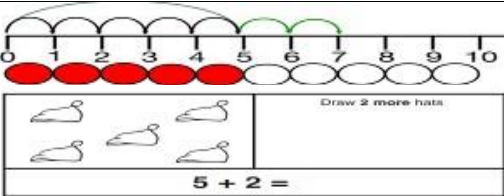




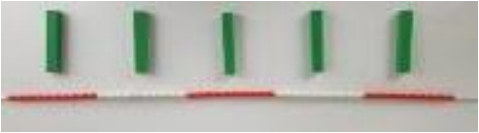

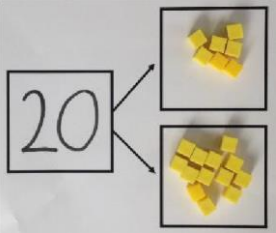
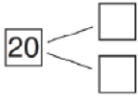
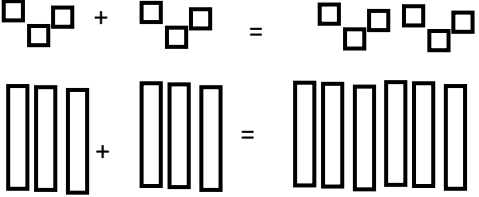
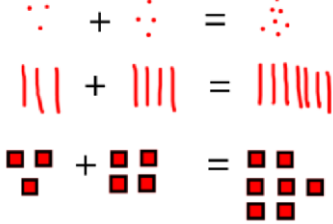


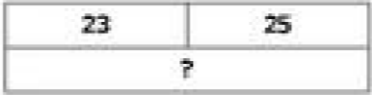
## Calculation Policy

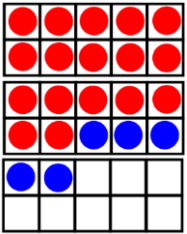
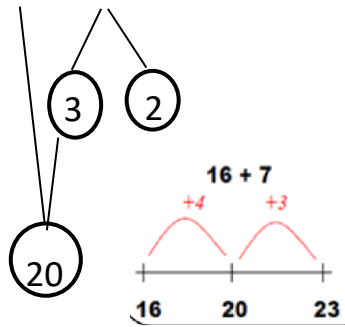

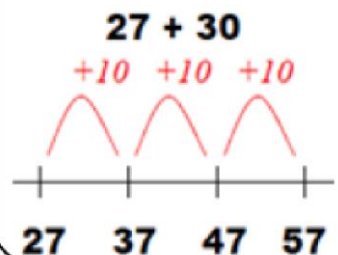

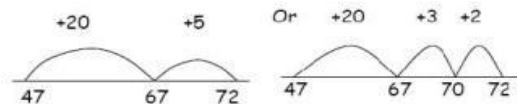
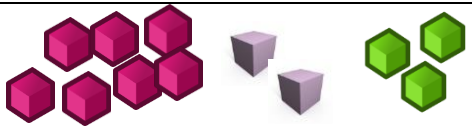
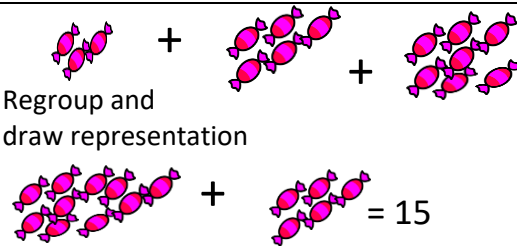
This policy has been largely adapted from the White Rose Maths Hub Calculation Policy with further material added. It is a working document and will be revised and amended as necessary.

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>	$4 + 3 = 7$  $10 = 6 + 4$ <p>Use the part-part whole diagram to move into the abstract</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>	 $12 + 5 = 17$ <p>Start at the larger number on the number line and count on in ones or in one jump to find the answer.</p>	$5 + 12 = 17$ <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>	 $6 + 5 = 11$  <p>Start with the bigger number and use the smaller number to make 10. Use ten frames</p>	 $3 + 9 =$ <p>Use pictures or a number line. Regroup or partition the smaller number using the part part whole model to make 10.</p>	$7 + 4 = 11$ <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> $5 + 2 =$	<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

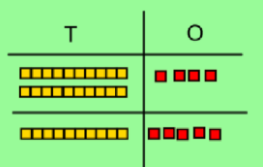
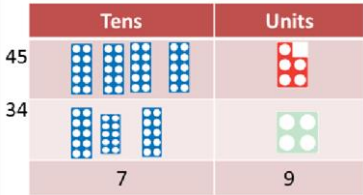
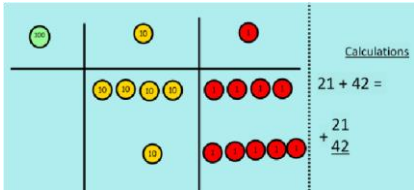
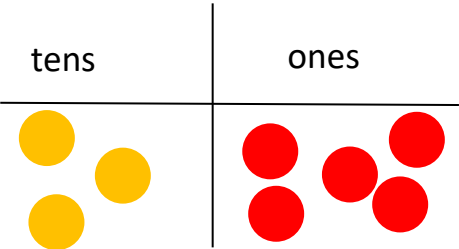
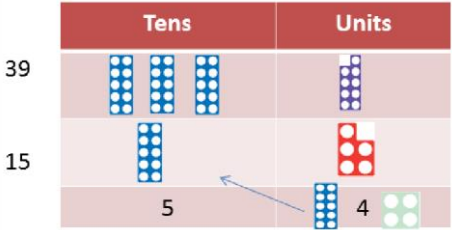
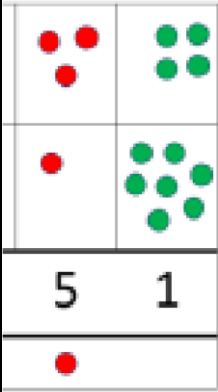
# Addition +

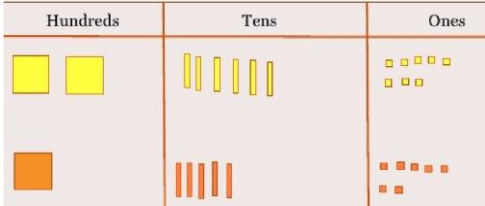
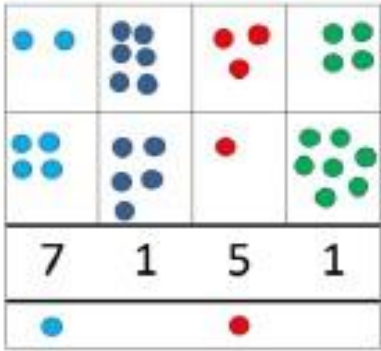
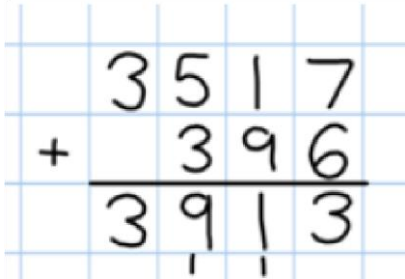
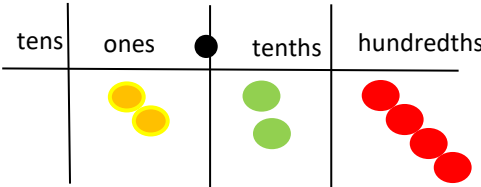
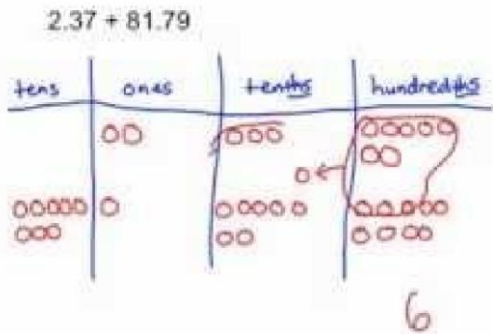
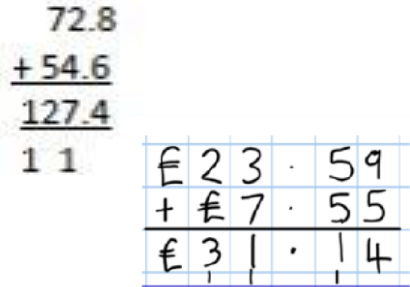
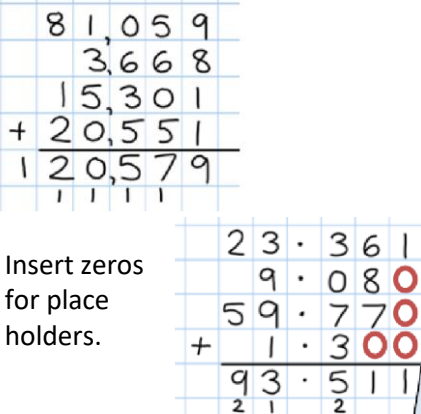
Objective & strategy	Concrete	Pictorial	Abstract
Adding multiples of 10	$50 = 30 + 20$  Model using dienes and bead strings	 $3 \text{ tens} + 5 \text{ tens} = \underline{\hspace{2cm}} \text{ tens}$ $30 + 50 = \underline{\hspace{2cm}}$ Use representations for base ten.	$20 + 30 = 50$ $70 = 50 + 20$ $40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

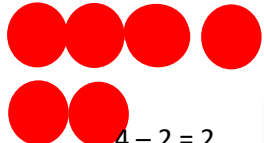

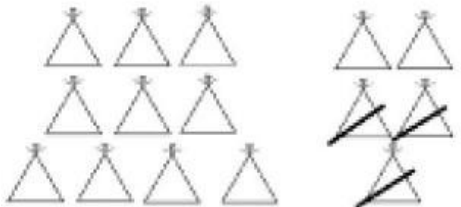

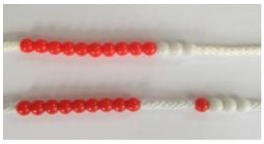
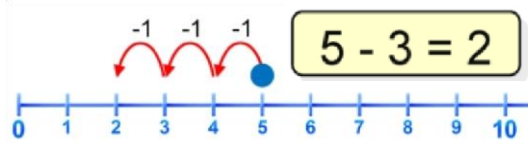
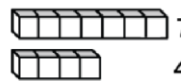
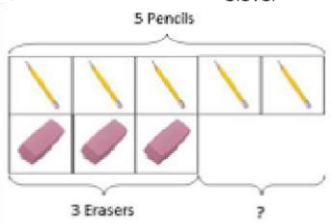
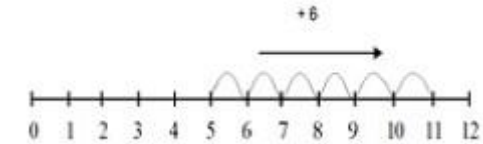
Objective & strategy	Concrete	Pictorial	Abstract
Add a 2-digit number and ones  Children explore the pattern: $17 + 5 = 22$ $27 + 5 = 32$	 <p>17 + 5 = 22</p> <p>Use ten frame to make 'magic' ten</p>	<p>17 + 5 = 22</p> <p>Use part part whole and number line to model.</p> 	$17 + 5 = 22$  Explore related 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><math>25 + 10 = 35</math></p>	 <p><math>27 + 30</math></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>	$25 + 47$ $20 + 5$ $40 + 7$ $20 + 40 = 60$ $5 + 7 = 12$ $60 + 12 = 72$
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><math>4 + 7 + 6 = 15</math></p>	Combine the two numbers that make/bridge ten then add on the third number $4 + 7 + 6 = 10 + 7 = 17$

# Y3

# Addition +

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 onto 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 pv counters, numicon or dienes.</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> $\begin{array}{r} 536 \\ + 85 \\ \hline 621 \\ 11 \end{array}$

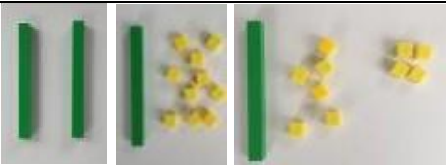
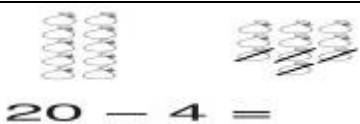
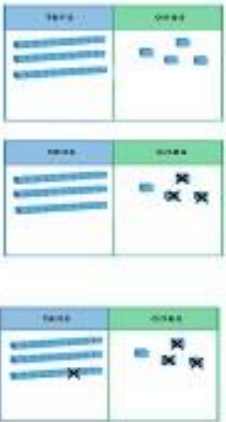
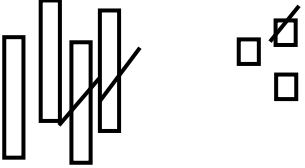
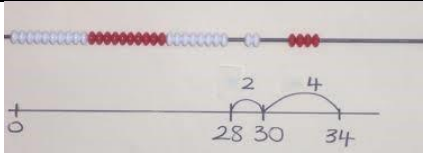
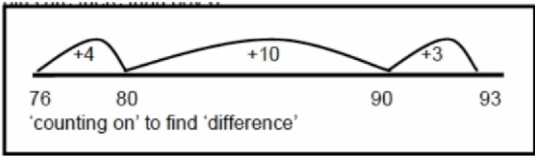
Objective & strategy	Concrete	Pictorial	Abstract	<div>Y</div> <div>4-6</div> <div>Addition +</div>
<p>Y4—add numbers with up to 4 digits</p>	 <p>Children continue to use dienes or pv counters to add, exchanging ten ones for a ten and ten tens for a hundred and ten hundreds for a thousand</p>	 <p>Draw representations using a pv grid</p>	 <p>Continue from previous work to carry hundred as well as tens.</p> <p>Relate to money and measure.</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 above.</p>  <p>Introduce decimal place value counters and model exchange for addition</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 year 5</p>	<p>As year 5</p>	 <p>Insert zeros for place holders.</p>	

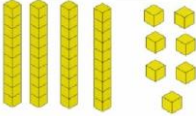
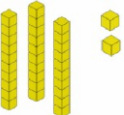
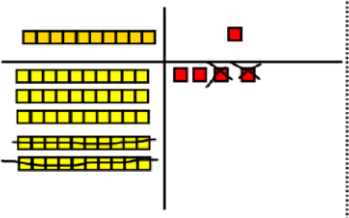
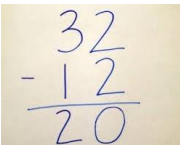
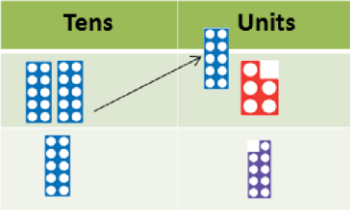
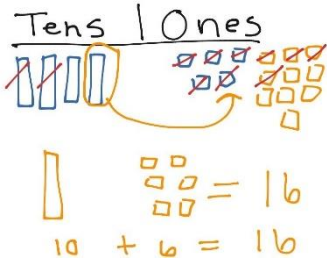
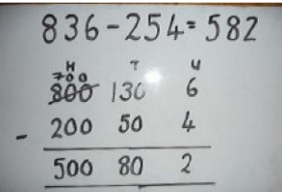
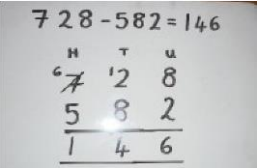
Objective & strategy	Concrete	Pictorial	Abstract
Taking away ones	<p>Use physical objects, counter, cubes etc to show how objects can be taken away.</p> <p><math>6 - 4 = 2</math></p>  <p><math>4 - 2 = 2</math></p> 	<p>Cross out drawn objects to show what has been taken away.</p>  <p><math>15 - 3 = 12</math></p>	<p><math>7 - 4 = 3</math></p> <p><math>16 - 9 = 7</math></p>
Counting back	 <p>Move objects away from the group, counting backwards.</p>  <p>Move the beads along the bead string as you count back.</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>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> 	<p>Hannah has 12 sweets and her sister has 5. How many more does Hannah have than her sister?</p>

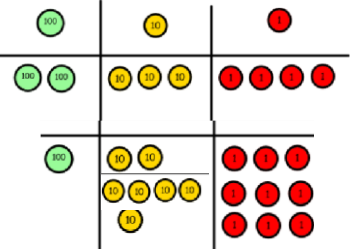
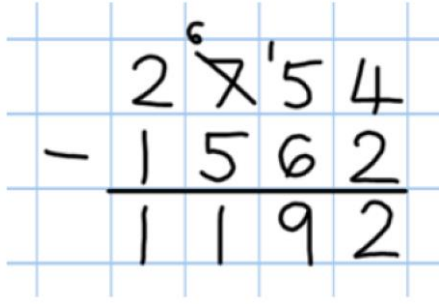
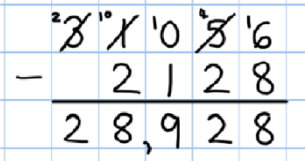
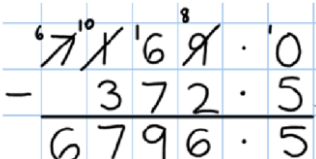
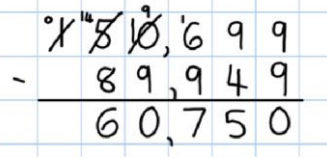
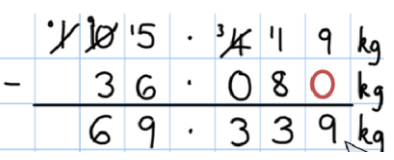


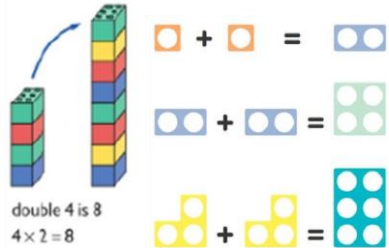

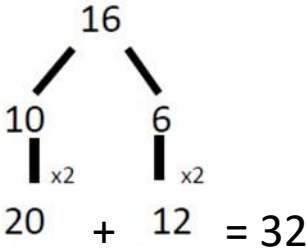
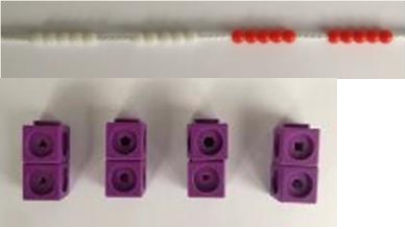
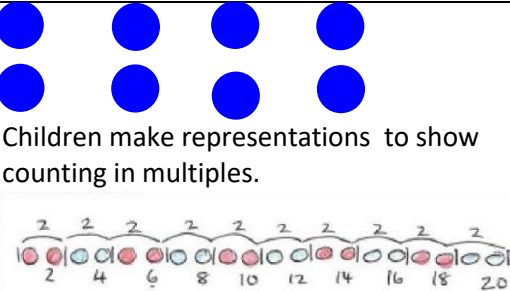


Objective & strategy	Concrete	Pictorial	Abstract	<div>Y1</div> <div>Subtraction -</div>
Represent and use number bonds and related subtraction facts within 20 <b>Part Part Whole model</b>	<div data-bbox="371 201 568 395"> </div> <div data-bbox="591 201 869 292">           Link to addition. Use PPW model to model the inverse.         </div> <div data-bbox="371 411 806 475">           If 10 is the whole and 6 is one of the parts, what is the other part?         </div> <div data-bbox="383 523 508 552"> <math>10 - 6 = 4</math> </div>	<div data-bbox="904 193 1227 427"> </div> <div data-bbox="904 435 1386 507">           Use pictorial representation to show the part.         </div>	<div data-bbox="1456 193 1868 443"> </div> <div data-bbox="1456 451 1924 515">           Move to using numbers within the part whole model.         </div>	
Make 10	<div data-bbox="371 568 828 762"> </div> <div data-bbox="371 770 848 871">           Make 14 on the ten frame. Take 4 away to make ten, then take one more away so that you have taken 5.         </div>	<div data-bbox="904 568 1413 687"> <math>13 - 7</math> </div> <div data-bbox="896 715 1426 783">           Jump back 3 first, then another 4. Use ten as the stopping point.         </div>	<div data-bbox="1659 568 1733 596"> <math>16 - 8</math> </div> <div data-bbox="1456 611 1924 675">           How many do we take off first to get to 10? How many left to take off?         </div>	
Bar model	<div data-bbox="400 874 837 1042"> </div> <div data-bbox="562 1090 678 1121"> <math>5 - 2 = 3</math> </div>	<div data-bbox="904 879 1317 1010"> </div>	<div data-bbox="1464 879 1935 970"> </div> <div data-bbox="1456 1010 1574 1145"> <math>10 = 8 + 2</math>  <math>10 = 2 + 8</math>  <math>10 - 2 = 8</math>  <math>10 - 8 = 2</math> </div>	

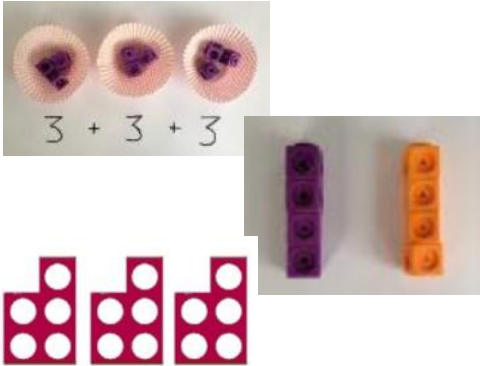
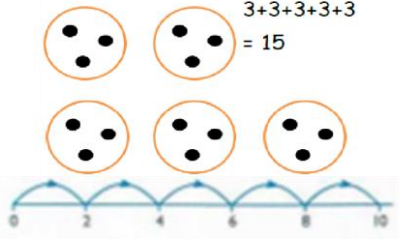

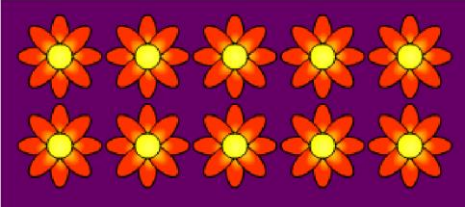
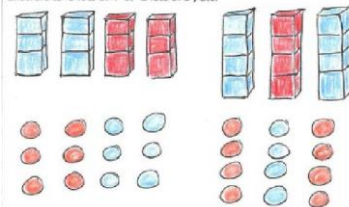


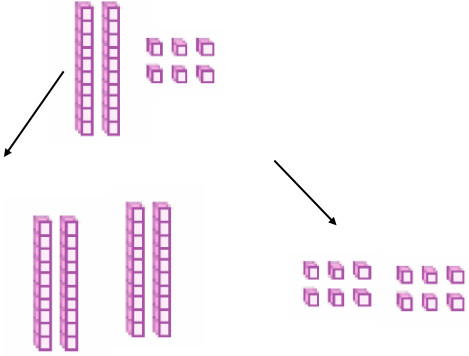
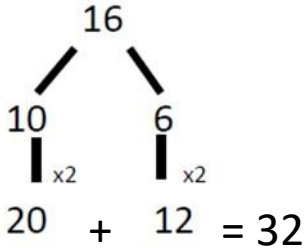
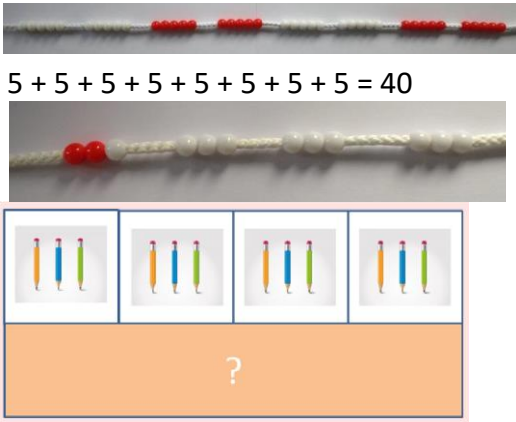
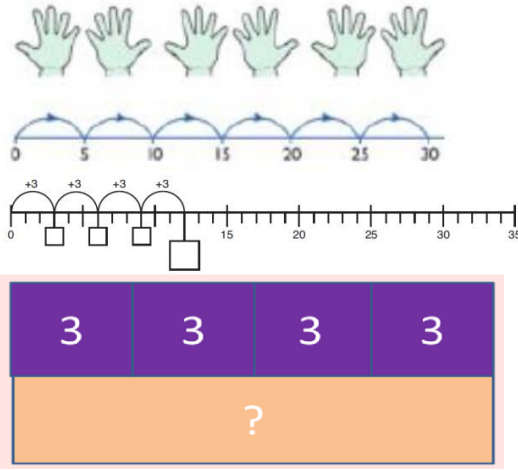
Objective & strategy	Concrete	Pictorial	Abstract	<div>Y2</div> <div>Subtraction -</div>
Regroup a ten into ten ones	 <p>Use a pv chart to show how to change a ten into ten ones, use the term 'take and make'</p>		$20 - 4 = 16$	
Partitioning to subtract without regrouping. <i>'Friendly numbers'</i>	$34 - 13 = 21$  <p>Use dienes to show how to partition the number when subtracting without regrouping</p>	Children draw representations of dienes and cross off.  $43 - 21 = 22$	$43 - 21 = 22$	
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>	$93 - 76 = 17$	

Objective & strategy	Concrete	Pictorial	Abstract	<div data-bbox="1989 124 2096 196" data-label="Text">Y3</div> <div data-bbox="1989 496 2096 1187" data-label="Section-Header">Subtraction -</div>
Column subtraction without regrouping (friendly numbers)	 $47 - 32$  <p>Use base 10 or Numicon to model</p>	 <p>Draw representations to support understanding</p> <div data-bbox="1265 223 1388 375"> <p>Calculations</p> <math display="block">\begin{array}{r} 54 \\ - 22 \\ \hline 32 \end{array}</math> </div>	$47 - 24 = 23$ $\begin{array}{r} 40 + 7 \\ - 20 + 4 \\ \hline 20 + 3 \end{array}$ <p>Intermediate step may be needed to lead to clear subtraction understanding</p> 	
Column subtraction with regrouping	 <p>Begin with dienes 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>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>	





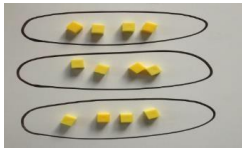
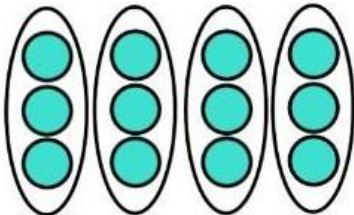
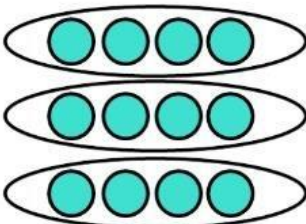


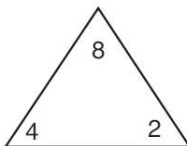
Objective & strategy	Concrete	Pictorial	Abstract	<div>Y</div> <div>4-6</div> <div>Subtraction -</div>
Subtracting tens and ones  Year 4 subtract with up to 4 digits. <i>Introduce decimal subtraction through context of money</i>	<div>234 - 179</div>  <p>Model process of exchange using numicon, dienes and then move to PV counters.</p>	Children to draw pv counters and show their exchange—see Y3.	 <p>Use the phrase 'take and make' for exchange.</p>	
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.	 <p>Use zeros for place holders</p> 	
Year 6—Subtract with increasingly large and more complex numbers and decimal values			 	

Objective & strategy	Concrete	Pictorial	Abstract	<div>Y1</div> <div>Multiplication x</div>
Doubling	Use practical activities using manipulatives including cubes and numicon to demonstrate doubling. 	Double 4 is 8  <p>Draw pictures to show how to double numbers.</p>	 <p>Partition a number and then double each part before recombining it back together.</p>	
Counting in multiples	Count the groups as children are skip counting, children may use their fingers as they are skip counting. 	 <p>Children make representations to show counting in multiples.</p>	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25, 30	
Making equal groups and counting the total	 <p>Use manipulatives to create equal groups.</p>	<p>Draw  to show <math>2 \times 3 = 6</math></p> <p>Draw and make representations.</p>	$2 \times 4 = 8$	

Objective & strategy	Concrete	Pictorial	Abstract	<div>Y1</div> <div>Multiplication</div>
Repeated addition	 <p>Use different objects to add equal groups.</p>	<p>There are 3 sweets in one bag. How many sweets are in 5 bags altogether?</p>  <p>Use pictorials including number lines to solve problems.</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 of 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	<div>Y2</div> <div>Multiplication x</div>
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> 	
<p>Counting in multiples of 2, 3, 4, 5, 10 from 0</p> <p>(repeated addition)</p>	<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	Y2  Multiplication x
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><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>	
Using the Inverse	<p><i>This should be taught alongside division, so pupils learn how they work alongside each other.</i></p> 	 <div><div><input type="text"/></div> × <div><input type="text"/></div> = <div><input type="text"/></div></div> <div><div><input type="text"/></div> × <div><input type="text"/></div> = <div><input type="text"/></div></div> <div><div><input type="text"/></div> ÷ <div><input type="text"/></div> = <div><input type="text"/></div></div> <div><div><input type="text"/></div> ÷ <div><input type="text"/></div> = <div><input type="text"/></div></div>	<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>	



# Y3

# Multiplication x

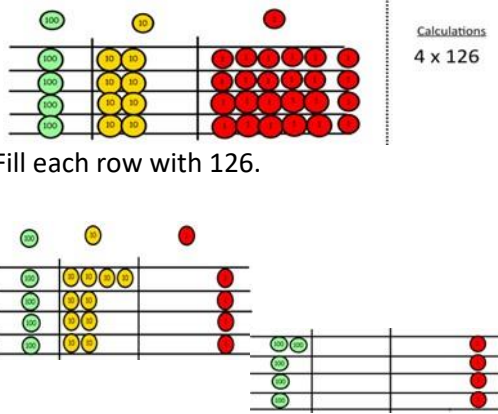
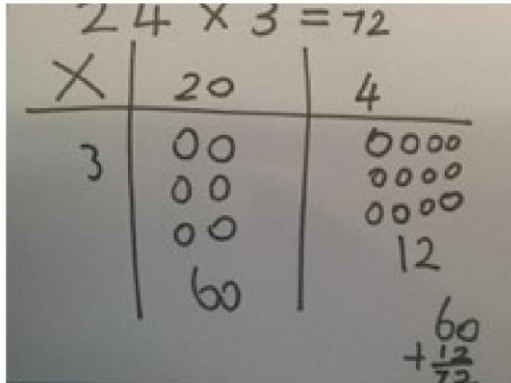


Objective & strategy	Concrete	Pictorial	Abstract																																																																													
<p>Grid method</p> <p>Show the links with arrays to first introduce the grid method.</p> <div><table><tr><td>x</td><td>10</td><td>3</td></tr><tr><td>4</td><td></td><td></td></tr></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></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>Calculations 4 x 126</p></div> <p>Fill each row with 126</p> <div><table><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>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></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><table><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></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> <div></div> <p>Bar model are used to explore missing numbers.</p> <div><div>4 x <input type="text"/> = 20</div><div><div>20</div><div>4</div></div></div>	<p>Start with multiplying by one digit numbers and showing the clear addition alongside the grid.</p> <div><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></div> <p>Moving forward, multiply by a 2 digit number showing the different rows within the grid method.</p> <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>	x	30	5	7	210	35		10	8	10	100	80	3	30	24
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Y3

Multiplication x

# Y4

# Multiplication x



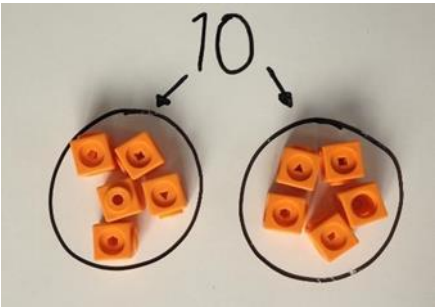

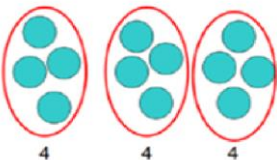
Objective & strategy	Concrete	Pictorial	Abstract																																																
<p>Grid method recap from Y3 for 2-digits x 1-digit</p> <p>Move to multiplying 3-digit by 1-digit</p>	<p>Use pv counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.</p> <div></div> <p>Fill each row with 126.</p> <p>Add up each column, starting with the ones making any exchanges needed.</p>	<p>Children can represent their work with pv counters in a way they understand. They can draw the counters using colours to show different amounts or just use the circles in the different columns to show their thinking.</p> <div></div>	<p>Start with multiplying by 1-digit numbers and showing the clear addition alongside the grid.</p> <div><table border="1"><tr><td>x</td><td>30</td><td>5</td></tr><tr><td>7</td><td>210</td><td>35</td></tr></table><p>210 + 35 = 245</p></div>	x	30	5	7	210	35																																										
x	30	5																																																	
7	210	35																																																	
<p>Column multiplication</p>	<p>Children can continue to be supported by pv counters at this stage of multiplication. This initially is done where there is no regrouping. Eg 321 x 2 = 642</p> <div><table border="1"><thead><tr><th></th><th>Hundreds</th><th>Tens</th><th>Ones</th></tr></thead><tbody><tr><td></td><td>3</td><td>2</td><td>1</td></tr><tr><td></td><td>3</td><td>2</td><td>1</td></tr><tr><td></td><td>3</td><td>2</td><td>1</td></tr><tr><td></td><td>3</td><td>2</td><td>1</td></tr></tbody></table></div> <p>Corresponding long multiplication is modelled alongside.</p>		Hundreds	Tens	Ones		3	2	1		3	2	1		3	2	1		3	2	1	<div><table border="1"><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><p>327</p><p>X 4</p><p>28</p><p>80</p><p>1200</p><p>1308</p></div> <div><table border="1"><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><tr><td></td><td></td><td></td><td>8</td></tr></table><p>This may lead to a compact method</p></div>		3	2	7	x			4		1	3	0			1	2				8
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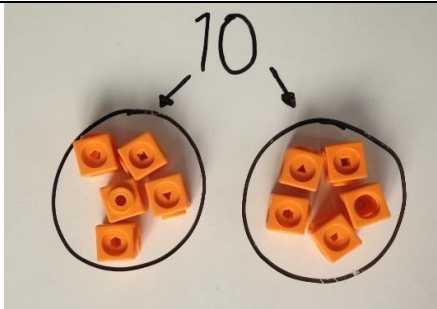

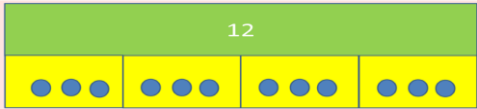
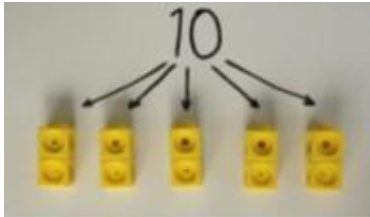
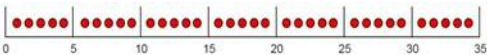
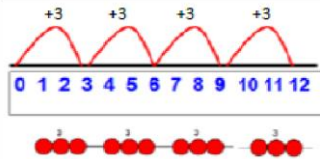

Y4

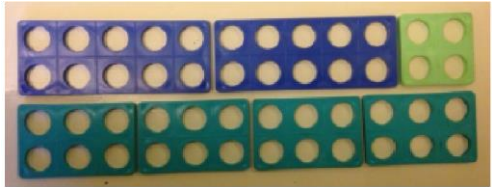

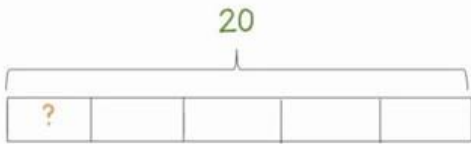

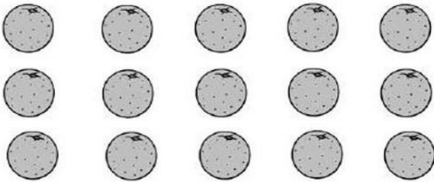
Multiplication x

Objective & strategy	Concrete	Pictorial	Abstract	Y 5-6  Multiplication x
Column multiplication for 3 and 4-digits x 1-digit	<div><div><div>Hundreds</div><div>Tens</div><div>Ones</div></div><div><div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div><div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div><div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div></div><div>It is important at this stage that they always multiply the ones first.</div><div>Children can continue to be supported by pv counters. This initially is done where there is no regrouping eg <math>321 \times 2 = 642</math></div></div>	<div><div><div><div>x</div><div>300</div><div>20</div><div>7</div></div><div><div>4</div><div>1200</div><div>80</div><div>28</div></div></div><div></div><div>The grid method may be used to show how this relates to a formal written method.</div><div>Bar modelling and number lines can also support learners when solving problems with multiplication alongside formal written methods.</div></div>	<div><div><div>327</div><div>X 4</div><div>28</div><div>80</div><div>1200</div><div>1308</div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div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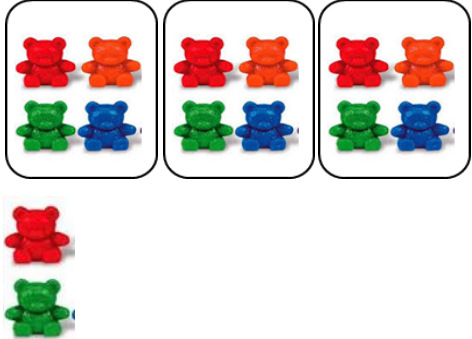
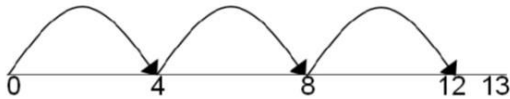

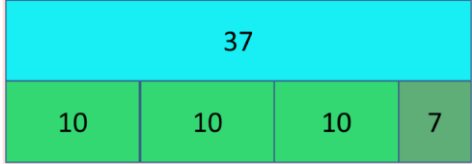
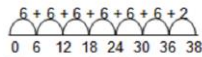
Objective & strategy	Concrete	Pictorial	Abstract	<div>Y6</div> <div>Multiplication x</div>																								
Multiplying decimals up to 2 decimal places by a single digit			<p>Remind children that the single digit belongs in the ones column. Line up the decimal points in the question and the answer.</p> <div><table><tr><td></td><td>3</td><td>.</td><td>1</td><td>9</td></tr><tr><td>x</td><td>8</td><td></td><td></td><td></td></tr><tr><td colspan="5"><hr/></td></tr><tr><td>2</td><td>5</td><td>.</td><td>5</td><td>2</td></tr><tr><td></td><td>1</td><td></td><td>7</td><td></td></tr></table></div>			3	.	1	9	x	8				<hr/>					2	5	.	5	2		1		7
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Objective & strategy	Concrete	Pictorial	Abstract	<div data-bbox="1989 124 2094 196">Y1</div> <div data-bbox="1989 571 2094 1090">Division ÷</div>
<p>Division as sharing</p> <p>Search Gordons ITP for interactive resources</p>	<div data-bbox="349 196 676 435">  </div> <div data-bbox="533 448 851 684">  </div> <div data-bbox="342 699 775 1007">  </div> <p>I have 10 cubes, can you share them equally in 2 groups?</p>	<p>Children use pictures or shapes to share quantities.</p> <div data-bbox="904 280 1301 435">  </div> <p>8 shared between 2 is 4</p> <div data-bbox="909 579 1314 794"> <p>Sharing:</p>  <p>12 shared between 3 is 4</p> </div>	<p>12 shared between 3 is 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>  <p><math>8 \div 2 = 4</math></p> <p>Children use bar modelling to show and support understanding.</p>  <p><math>12 \div 4 = 3</math></p>	<p><math>12 \div 3 = 4</math></p>
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><math>12 \div 3 = 4</math></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><math>20 \div 5 = ?</math>  <math>5 \times ? = 20</math></p>	<p><math>28 \div 7 = 4</math></p> <p>Divide 28 into 7 groups. How many are in each group?</p>

Objective & strategy	Concrete	Pictorial	Abstract	<div>Y3</div> <div>Division ÷</div>
Division as grouping	<p>Use cubes, counter, objects or pv 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 <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> $7 \times 4 = 28$ $4 \times 7 = 28$ $28 \div 7 = 4$ $28 \div 4 = 7$ $28 = 7 \times$ $4 \times 7 =$ $4 \times 7$ $4 = 28 \div 7$ $7 = 28 \div 4$	



Objective & strategy	Concrete	Pictorial	Abstract	<div>Y3</div> <div>Division ÷</div>
Division with remainders	<p><math>14 \div 3 =</math></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>Example without remainder:  <math>40 \div 5</math>            Ask "How many 5s in 40?" <math>5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 8 \text{ fives}</math></p> <p>Example with remainder:  <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> <div><div>Tens</div><div>Units</div><div>3</div><div>2</div><div><div><div><div>10</div><div>10</div><div>10</div></div><div><div>10</div><div>10</div><div>10</div></div><div><div>10</div><div>10</div><div>10</div></div></div><div><div><div>1</div><div>1</div></div><div><div>1</div><div>1</div></div><div><div>1</div><div>1</div></div></div></div></div> <p>Use place value counters to divide using the bus stop method alongside.</p> <div><div><div>10</div><div>10</div><div>10</div><div>10</div></div><div><div>1</div><div>1</div></div></div> <div><div>Calculations</div><div><math>42 \div 3</math></div></div> <div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div></div> <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> <div><div><div>10</div></div><div><div>1</div><div>1</div></div></div> <div><div><div><div>10</div><div>10</div><div>10</div></div></div></div> <p>We exchange this ten for ten ones and then share the ones equally among the groups.</p> <div><div><div><div>10</div><div>10</div><div>10</div></div><div><div>1</div><div>1</div><div>1</div><div>1</div><div>1</div><div>1</div><div>1</div><div>1</div><div>1</div><div>1</div></div></div></div> <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> <div><div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div></div></div> <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> <div><div><div>2</div><div>1</div><div>8</div></div><div><div>3</div></div><div><div>4</div><div>8</div><div>7</div><div>2</div></div></div> <p>Move onto divisions with a remainder.</p> <div><div><div>8</div><div>6</div><div>r</div><div>2</div></div><div><div>3</div></div><div><div>5</div><div>4</div><div>3</div><div>2</div></div></div> <p>Finally move into decimal places to divide the total accurately.</p> <div><div><div><div>1</div><div>4</div><div>.</div><div>6</div></div><div><div>16</div><div>21</div></div></div><div><div>3</div><div>5</div><div>5</div><div>1</div><div>1</div><div>.</div><div>0</div></div></div> <div><div><div><div>0</div><div>6</div><div>6</div><div>3</div><div>r</div><div>5</div></div><div><div>8</div><div>5</div><div>3</div><div>0</div><div>9</div></div></div></div>

Y

4-6

Division ÷

## Long Division

# Y6

# Division ÷

Step 1 – a remainder in the ones

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

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.

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

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

Y6

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

Y6

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 ÷ 2 = 2 whole tens -- but there is a remainder!</p>	$\begin{array}{r} \text{t o} \\ 2 \overline{) 58} \\ -4 \phantom{0} \\ \hline 1 \phantom{0} \end{array}$ <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>	$\begin{array}{r} \text{t o} \\ 2 \overline{) 58} \\ -4 \downarrow \\ \hline 18 \end{array}$ <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.
$\begin{array}{r} \text{t o} \\ 2 \overline{) 58} \\ -4 \phantom{0} \\ \hline 18 \end{array}$ <p>Divide 2 into 18. Place 9 into the quotient.</p>	$\begin{array}{r} \text{t o} \\ 2 \overline{) 58} \\ -4 \phantom{0} \\ \hline 18 \\ -18 \\ \hline 0 \end{array}$ <p>Multiply <math>9 \times 2 = 18</math>, write that 18 under the 18, and subtract.</p>	$\begin{array}{r} \text{t o} \\ 2 \overline{) 58} \\ -4 \phantom{0} \\ \hline 18 \\ -18 \\ \hline 0 \end{array}$ <p>The division is over since there are no more digits in the dividend. The quotient is 29.</p>

## Long Division

# Y6

# 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>	$\begin{array}{r} \text{h t o} \\ 18 \\ 2 \overline{) 278} \\ -2 \downarrow \\ \hline 07 \end{array}$ <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>