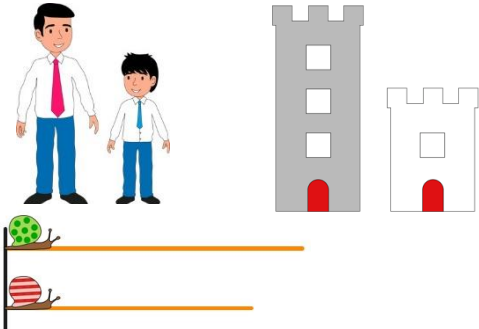
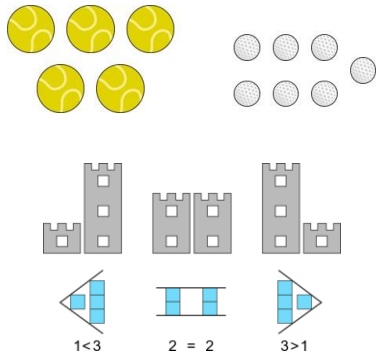
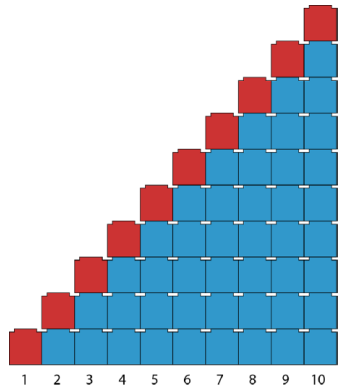
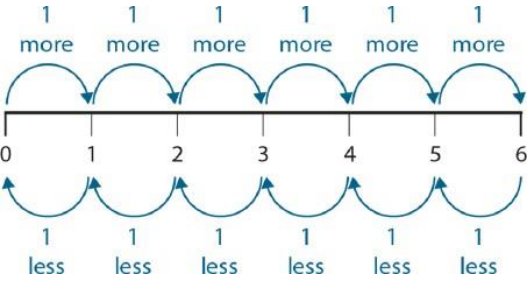


# Progress in Calculation




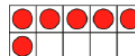
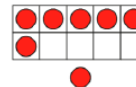
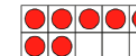



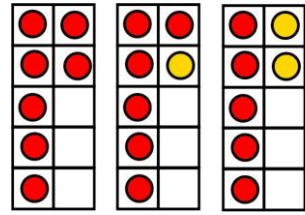
This calculation policy is a working document and will be revised and amended as necessary.

Some images have been copied from the NCETM PD materials.

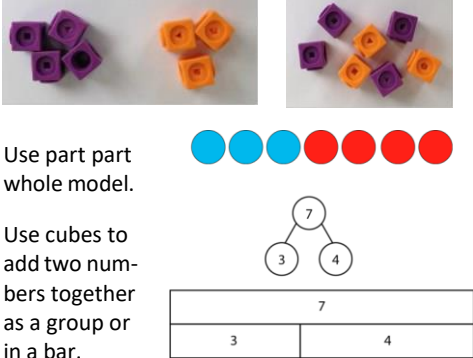
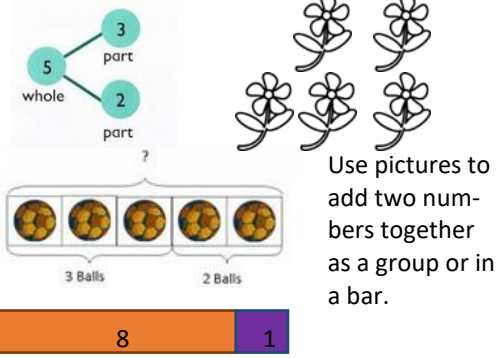
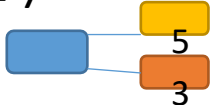

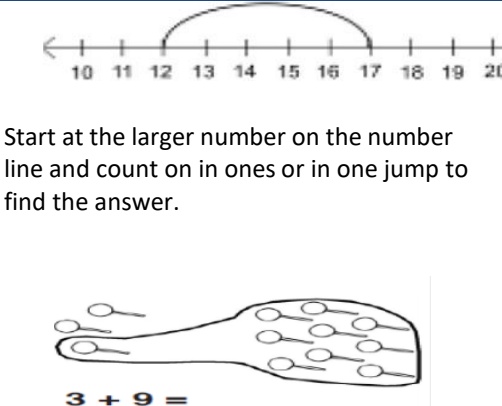
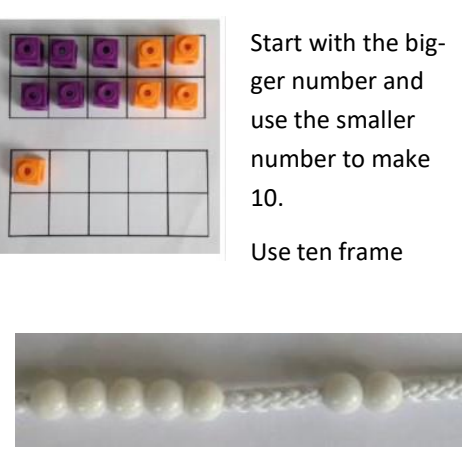
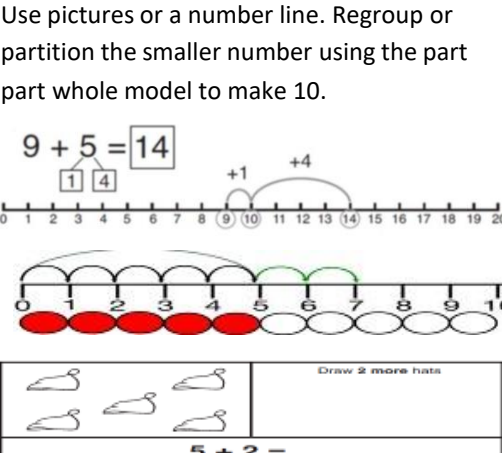
Objective, Strategy & Key Vocabulary	Concrete	Pictorial	Abstract
Comparing Objects, groups of objects  Length, weight, mass, heavier, lighter, same, equal	People's height, distance, mass. Use of pan balances using numicon to show equivalence, < > Comparing multiple objects Use of concrete materials eg. Compare bears, jewels, cubes etc to create groups of different sizes to compare		
Using < > and =  Fewer, more, less than, more than, equal to, fewer than	Use a multilink staircase in two colours		Use variation with missing boxes and missing symbols.  $3 \bigcirc 4$ $4 > \square$  $2 \bigcirc 2$ $\square < 6$
Finding one more, finding one less			One more/less sentences – example one: 1 more than 3 is <input type="text"/> 1 less than 2 is <input type="text"/>  1 more than <input type="text"/> is 1 1 less than <input type="text"/> is 1

# Y1

# ADDITION +

Objective, Strategy & Key Vocabulary	Concrete	Pictorial	Abstract
<p>Adding 1 gives 1 more</p>	<p>First  3</p> <p>Then  + 1</p> <p>Now  4</p>	<p>First  6</p> <p>Then  + 1</p> <p>Now  7</p>	$\begin{array}{ccc} 6 & + 1 & 7 \\ \hline & & \rightarrow \\ & 6 + 1 = 7 & \end{array}$
<p>Augmentation— increasing an amount</p>	<p>Use FIRST, THEN, NOW and range of practical situations for showing augmentation.</p> <p>E.g. first there were three chn on carpet then 2 more came. Now there are 5 chn on the carpet.</p>	<p>First  4</p> <p>Then  + 3</p> <p>Now  7</p>	$\begin{array}{ccc} 4 & + 3 & 7 \\ \hline & & \rightarrow \\ & 4 + 3 = 7 & \end{array}$
<p>Stories of numbers within 10</p>	<p>Children should work with doubled sided counters and ten frame.</p> <p>Start with 7 red, turn one over, tell me the 'story'?</p> <p>Turn one more over. What is the 'story'?</p> <p>Continue.</p> <p>Complete this for stories of all numbers up to 10.</p>	<p></p> <p>7 + 0 = 7 6 + 1 = 7 5 + 2 = 7 etc</p> <p>Complete for all numbers up to 10</p>	<p>7 + 0 = 7</p> <p>6 + 1 = 7</p> <p>5 + 2 = 7</p> <p>4 + 3 = 7</p> <p>3 + 4 = 7</p> <p>2 + 5 = 7</p> <p>1 + 6 = 7</p> <p>0 + 7 = 7</p>

# Y1 ADDITION +

Objective & Strategy	Concrete	Pictorial	Abstract
<p>Combining two parts to make a whole: part- whole model</p>	 <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><math>10 = 6 + 4</math></p> <p>Use the part-part whole diagram as shown above to move into the abstract.</p>
<p>Regrouping to make 10.</p> <p><i>This is an essential skill for column addition later.</i></p>	 <p><math>6 + 5 = 11</math></p> <p>2 more than 5.</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>3 + 9 =</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>
<p>Represent &amp; use number bonds and related subtraction facts within 20</p>	 <p>Start with the bigger number and use the smaller number to make 10.</p> <p>Use ten frame</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>Draw 2 more hats</p> <p><math>5 + 2 =</math></p>	<p>Emphasis should be on the language</p> <p><i>'1 more than 5 is equal to 6.'</i></p> <p><i>'2 more than 5 is 7.'</i></p> <p><i>'8 is 3 more than 5.'</i></p>

# Y1

# ADDITION +

Adding 1 and 2

Bonds to 10

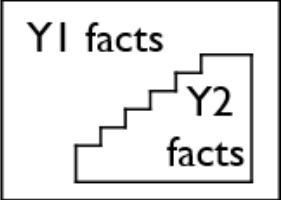
Adding 10

Bridging/  
compensating

Doubles

Adding 0


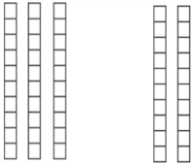
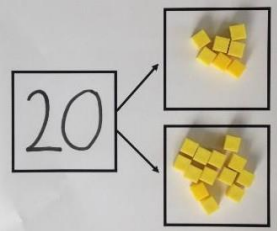
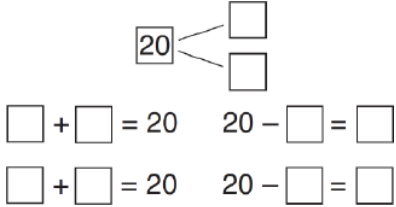
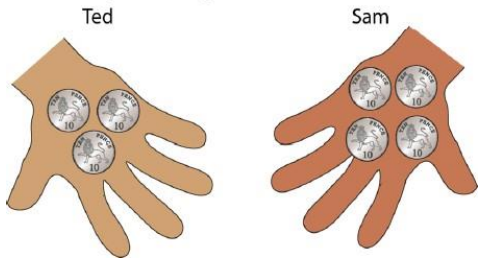
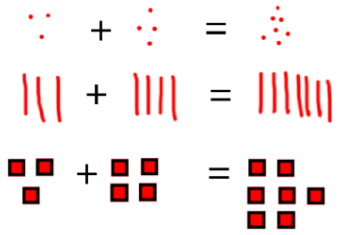

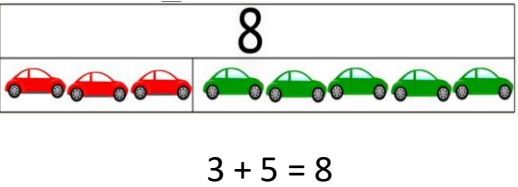
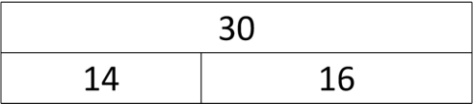
Near doubles

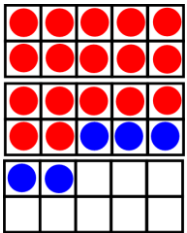
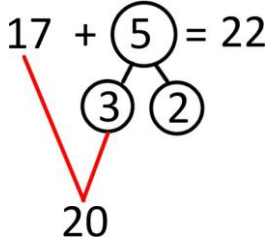
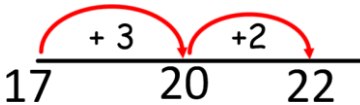
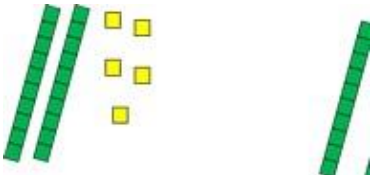
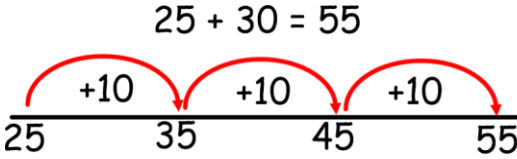
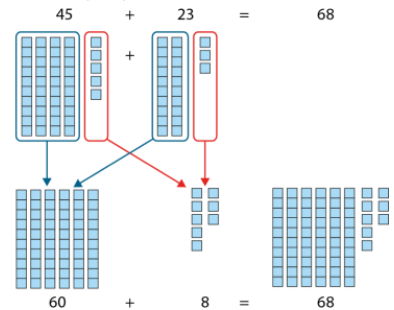
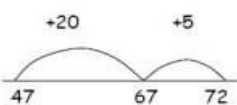
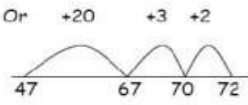


Y1/2

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1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	1+10
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9	2+10
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9	4+10
5	5+0	5+1	5+2	5+3	5+4	5+5	5+6	5+7	5+8	5+9	5+10
6	6+0	6+1	6+2	6+3	6+4	6+5	6+6	6+7	6+8	6+9	6+10
7	7+0	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9	7+10
8	8+0	8+1	8+2	8+3	8+4	8+5	8+6	8+7	8+8	8+9	8+10
9	9+0	9+1	9+2	9+3	9+4	9+5	9+6	9+7	9+8	9+9	9+10
10	10+0	10+1	10+2	10+3	10+4	10+5	10+6	10+7	10+8	10+9	10+10

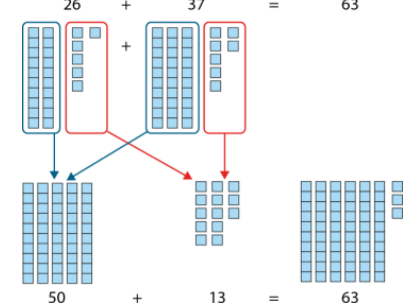
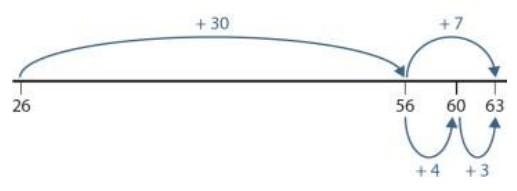


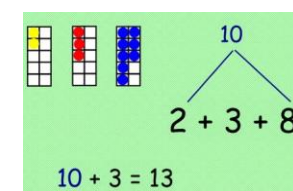
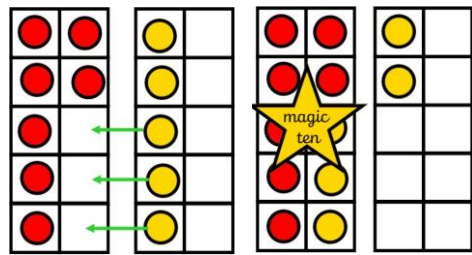
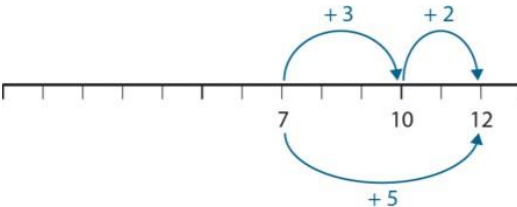
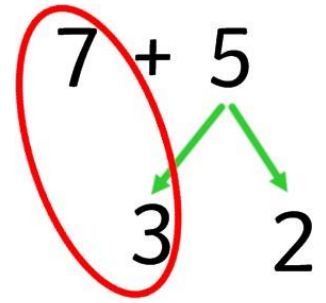
SUBTRACTION -  
 ADDITION +

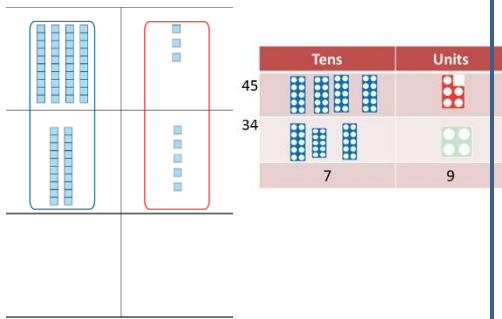
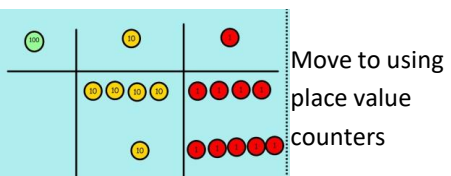
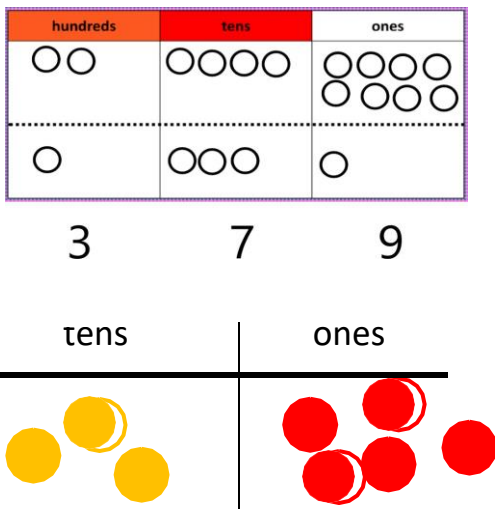
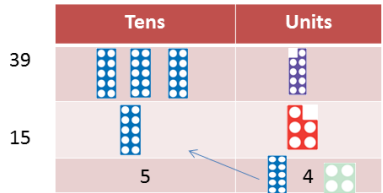
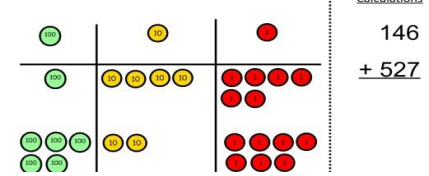
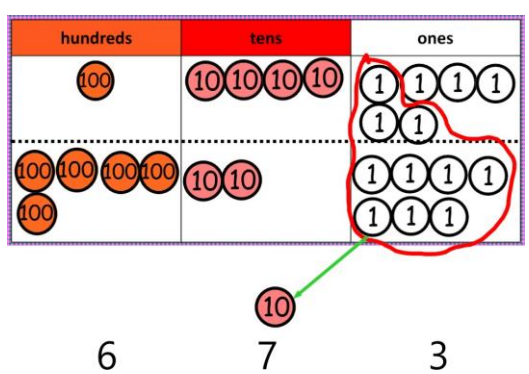
Objective & Strategy & Key Vocabulary	Concrete	Pictorial	Abstract
Adding multiples of ten	$50 = 30 + 20$  Model using dienes and bead strings	 ___tens and ___tens makes ___tens Use representations for base ten.	$20 + 30 = 50$ $70 = 50 + 20$ $40 + \square = 60$ $\square + 30 = 50$
Use known number facts  Part part whole	 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	 Ted                      Sam	 Children draw representations of H,T and O	$3 + 4 = 7$ Leads to $30 + 40 = 70$ Leads to $300 + 400 + 700$ <i>'3 things and 4 things is always 7 things'</i>
Bar model	 $3 + 4 = 7$	 $3 + 5 = 8$	 $14 + 16 = 30$

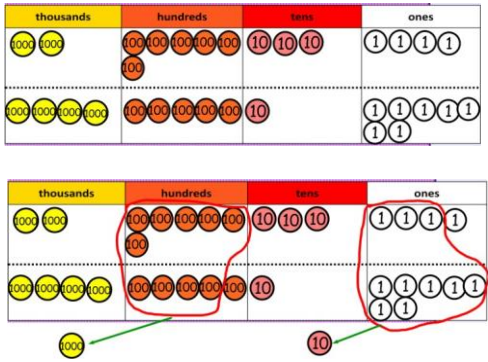
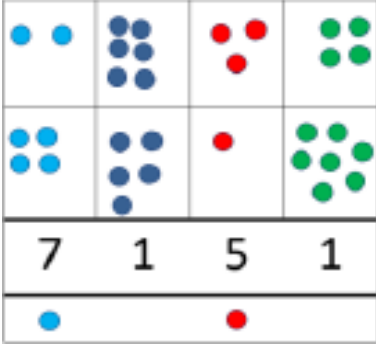
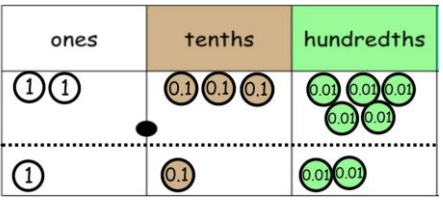
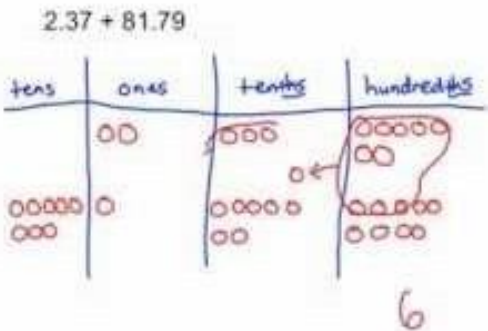
Objective & Strategy & Key Vocabulary	Concrete	Pictorial	Abstract				
Add a two digit number and ones	 <p><math>17 + 5 = 22</math></p> <p>Use ten frame to make 'magic ten'</p> <p>Children explore the pattern.</p> <p><math>17 + 5 = 22</math></p> <p><math>27 + 5 = 32</math></p>	<p>Use part part whole and number line to model.</p>  	<p><math>17 + 5 = 22</math></p> <table border="1" data-bbox="1680 231 1937 327"> <tr><td colspan="2">22</td></tr> <tr><td>17</td><td>5</td></tr> </table> <p>Explore related facts</p> <p><math>17 + 5 = 22</math>      <math>22 = 17 + 5</math></p> <p><math>5 + 17 = 22</math>      <math>22 = 5 + 17</math></p> <p><math>22 - 17 = 5</math>      <math>17 = 22 - 5</math></p> <p><math>22 - 5 = 17</math>      <math>5 = 22 - 17</math></p>	22		17	5
22							
17	5						
Add a 2 digit number and tens	 <p><math>25 + 10 = 35</math></p> <p>Explore that the ones digit does not change</p>	 <p><math>25 + 30 = 55</math></p>	<p><math>27 + 10 = 37</math></p> <p><math>27 + 20 = 47</math></p> <p><math>27 + \square = 57</math></p> <p><math>\square + 30 = 67</math></p>				
Add two 2-digit numbers without bridging. 'Friendly numbers'	<p>Model using dienes, place value counters and numicon</p> <p>Dienes and part-part-whole model:</p>  <p><math>45 + 23 = 68</math></p> <p><math>60 + 8 = 68</math></p>	 <p>Or</p>  <p>Use number line and bridge ten using part whole if necessary.</p>	<p><math>25 + 47</math></p> <p><math>20 + 5</math>      <math>40 + 7</math></p> <p><math>20 + 40 = 60</math></p> <p><math>5 + 7 = 12</math></p> <p><math>60 + 12 = 72</math></p>				

# Y2 ADDITION +

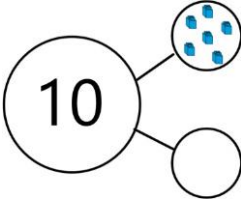
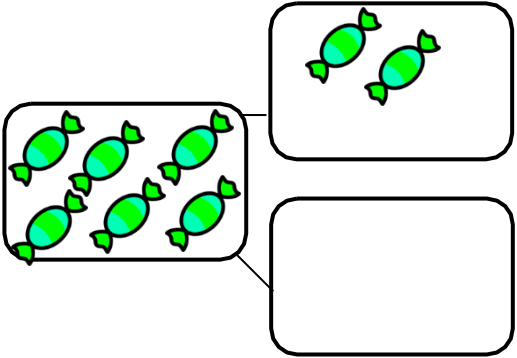
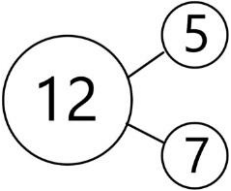
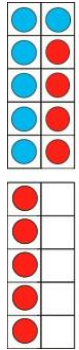
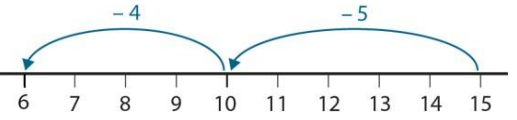
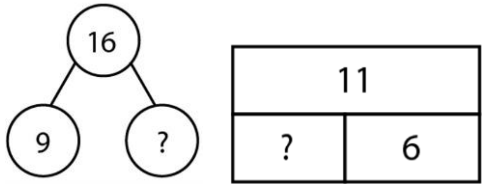
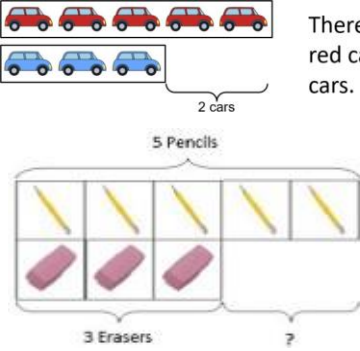
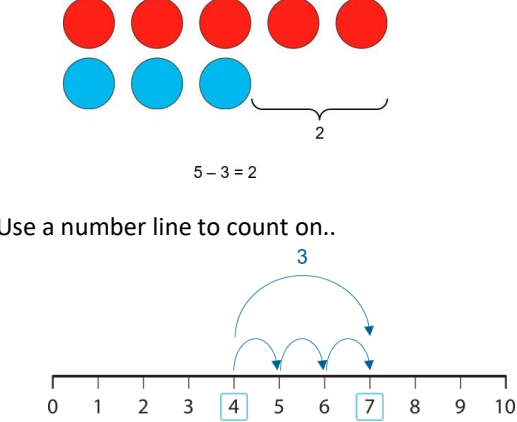
# Y2 ADDITION +

Objective & Strategy & Key Vocabulary	Concrete	Pictorial	Abstract
Add any two 2-digit numbers	<p>Dienes and part-part-whole model:</p> $26 + 37 = 63$ 	$26 + 30 + 7$ 	$24 + 38 = \square$ $29 + \square = 51$ $38 + 24 = \square$ $\square + 22 = 51$
Add three 1-digit numbers	 <p>Combine to make magic 10 first where relevant, or bridge 10 then add third</p>	<p>Use language of fist, then, then, now</p> <p>Pictorial:</p> <p>First      Then      Then      Now</p>  <p>Use part part whole to show magic ten</p>  $2 + 3 + 8$ $10 + 3 = 13$	$4 + 7 + 6 = 10 + 7$ $= 17$ <p>Combine the two numbers that make/bridge ten then add on the third.</p>
Adding two numbers that bridge 10.	 <p>Use double sided counters and ten frames. Move counters to fill the ten frame and make Magic 10</p>	 <p>Show on a number line how 5 is portioned into adding three, then adding 2.</p>	

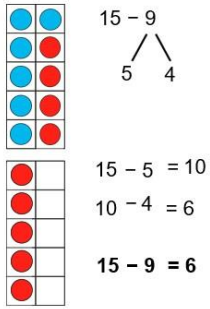
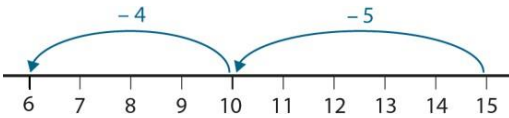
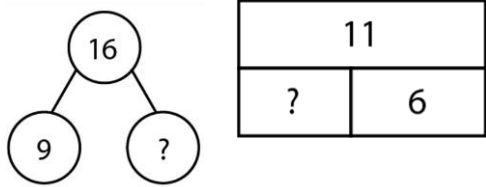
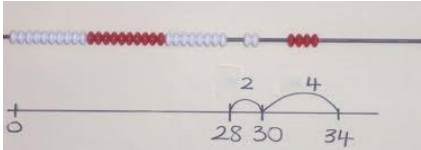
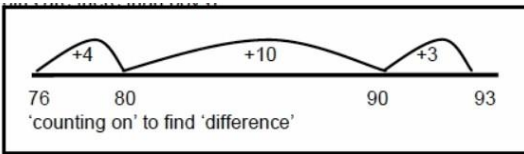
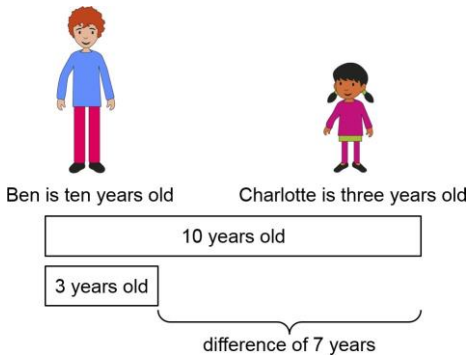
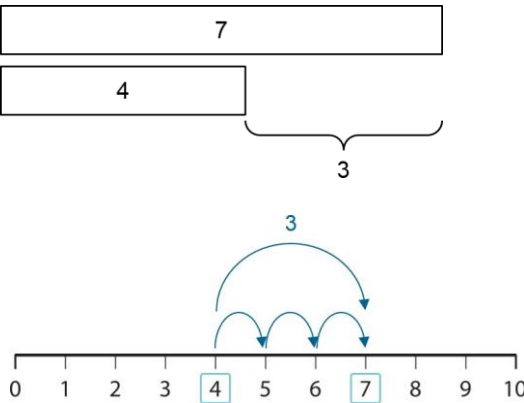
<b>Objective &amp; Strategy</b> <b>Key Vocab</b>	<b>Concrete</b> When moving from concrete to pictorial, show concrete alongside pictorial. Show pictorial alongside abstract when moving to abstract.	<b>Pictorial</b>	<b>Abstract</b>
Column Addition—no regrouping (friendly numbers)  Add two or three 2 or 3-digit numbers.	Model using Dienes or numicon  <p>Add together the ones first, then the tens.</p>  <p>Move to using place value counters</p>	Children move to drawing the counters using a tens and one frame. 	$\begin{array}{r} 248 \\ + 131 \\ \hline 379 \end{array}$ <p>Add the ones first, then the tens, then the hundreds.</p>
Column Addition with regrouping.  Use language of 'take and make' to describe carrying	 <p>Exchange ten ones for a ten. Model using numicon and pv counters.</p>  <p>Calculations</p> $\begin{array}{r} 146 \\ + 527 \\ \hline \end{array}$	Children can draw a representation of the grid to further support their understanding, carrying the ten <u>underneath</u> the line. 	Use expanded method ONLY WHEN NEEDED $\begin{array}{r} 20 + 5 \\ 40 + 8 \\ 60 + 13 = 73 \end{array}$ <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 & Key Vocabulary	Concrete	Pictorial	Abstract
<p>Y4—add numbers with up to 4 digits</p>	<p>Children continue to use dienes or pv counters to add, exchanging ten ones for a ten and ten tens for a hundred and ten hundreds for a thousand.</p> 	 <p>Draw representations using pv grid.</p>	$\begin{array}{r} 2634 \\ + 4517 \\ \hline 7141 \\ \hline 1 \quad 1 \end{array}$ <p>Continue from previous work to carry ones, tens and hundreds. Relate to money and measures.</p>
<p>Y5—add numbers with more than 4 digits.</p> <p>Add decimals with 2 decimal places, including money.</p>	<p>As year 4</p>  <p>Introduce decimal place value counters</p>		$\begin{array}{r} 22,634 \\ + 15,673 \\ \hline 38,307 \\ \hline 1 \quad 1 \end{array}$ $\begin{array}{r} \text{£ } 127.67 \\ + \text{£ } 38.45 \\ \hline \text{£ } 166.12 \\ \hline 1 \quad 1 \quad 1 \end{array}$
<p>Y6—add several numbers of increasing complexity</p> <p>Including adding money, measure and decimals with different numbers of decimal points.</p>	<p>Some children may need to use manipulatives and/or representations for longer. See year 5</p>		$\begin{array}{r} 89,472 \\ 63,673 \\ + 3,016 \\ \hline 156,161 \\ \hline 1 \quad 1 \quad 1 \quad 1 \end{array}$ $\begin{array}{r} 1.437 \\ 0.600 \\ + 3.020 \\ \hline 4.057 \\ \hline 1 \end{array}$ <p>Insert zeros for place holders.</p>

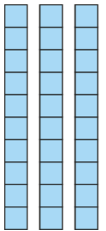
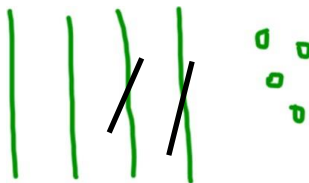
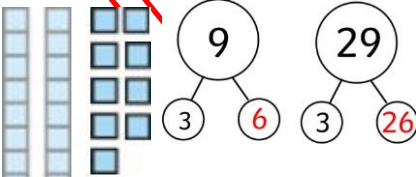
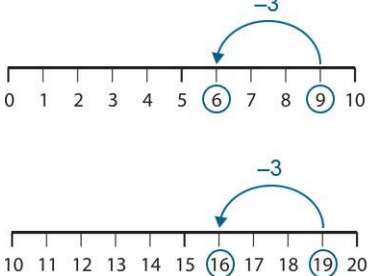

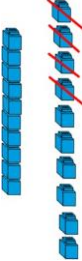

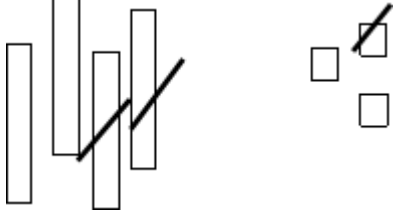
Y4-6  
ADDITION +

Objective & Strategy	Concrete	Pictorial	Abstract
<p>Represent and use number bonds and related subtraction facts within 20</p> <p>Part-Part-Whole model</p>	 <p>Link to addition. Use PPW model to model the inverse.</p> <p>If 10 is the whole and 6 is one of the parts, what's the other part?</p> $10 - 6 = 4$	 <p>Use pictorial representations to show the part.</p>	<p>Move to using numbers within the part whole model.</p>  $12 - 5 = 7$ $12 - 7 = 5$ $7 = 12 - 5$ $5 = 12 - 7$
<p>Subtract by making ten</p>	<p><b>15—9</b></p> <p>Make 15 on the ten frame. Take 5 away to make ten, then take 4 more away so that you have taken 9.</p>  $15 - 9$ $15 - 5 = 10$ $10 - 4 = 6$ $15 - 9 = 6$	<p><b>15 - 9</b></p>  <p>Jump back 5 first, then another 4. Use ten as the stopping point.</p>	<p><b>16—9</b></p> <p>How many do we take off first to get to 10? How many left to take off?</p> 
<p>Compare numbers by finding the difference.</p>	 <p>There are 2 more red cars than blue cars.</p> <p>There are 2 more pencils than erasers.</p>	 <p>Use a number line to count on..</p>	<p>Hannah has 12 sweets and her sister has 5. How many more does Hannah have than her sister?</p>

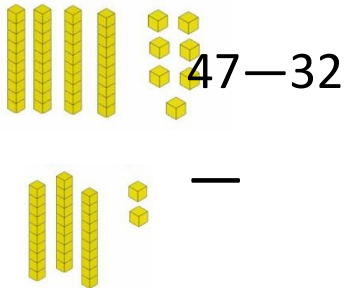
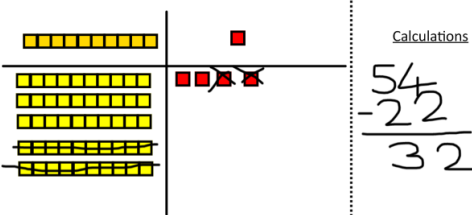
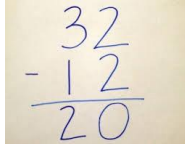
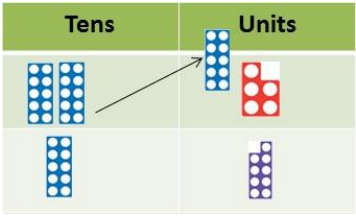
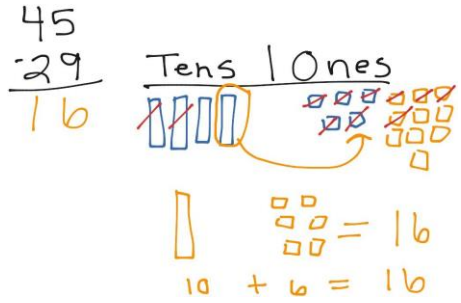
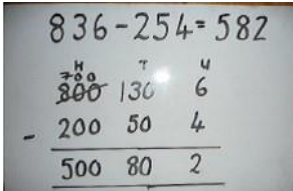
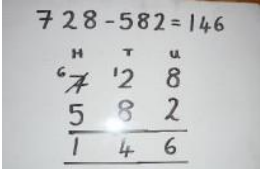
# Y1 SUBTRACTION -

Objective & Strategy	Concrete	Pictorial	Abstract
<p>Subtracting by making 10</p>	<p>Make 15 on the ten frame. Take 5 away to make ten, then take 4 more away so that you have taken 9.</p> <p><math>15 - 9 =</math></p> 	<p><math>15 - 9 =</math></p>  <p>Jump back 5 first, then another 4. Use ten as the stopping point.</p>	<p><math>16 - 9 =</math></p> <p>How many do we take off first to get to 10? How many left to take off?</p> 
<p>Counting on to next ten</p> <p><i>Progression should be crossing one ten, crossing more than one ten, crossing the hundreds.</i></p>	<p><math>34 - 28 =</math></p>  <p><math>34 - 28</math></p> <p>Use a bead bar or bead strings to model counting to next ten and the rest.</p> <p>28 to 30 is 2, 30 to 34 is 4. So, <math>34 - 28 = 6</math></p>	 <p>Use a number line to count on to next ten and then the rest.</p> <p>Begin with bead line, move to landmark line then to ENL.</p>	<p><math>93 - 76 = 17</math></p> <p><math>76 \rightarrow 80 = 4</math></p> <p><math>80 \rightarrow 93 = 13</math></p> <p><math>13 + 4 = 17</math></p>
<p>Subtractions as difference</p>	 <p>Ben is ten years old      Charlotte is three years old</p> <p>10 years old</p> <p>3 years old</p> <p>difference of 7 years</p>		<p>The difference between 24 and 16 is 8.</p>

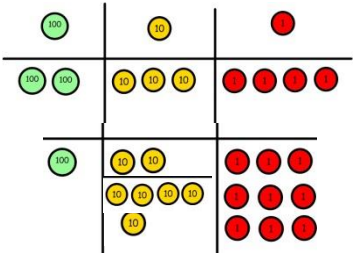
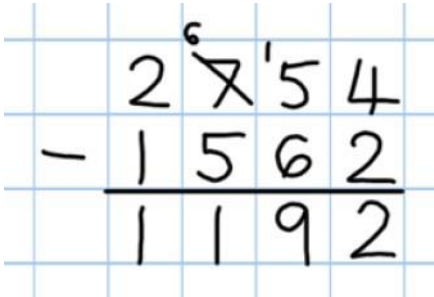
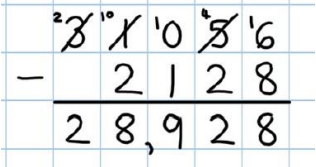
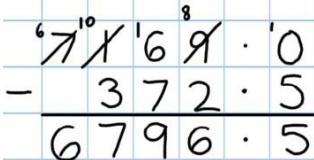
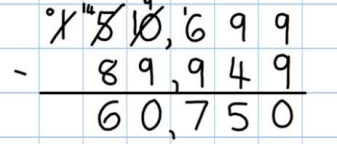
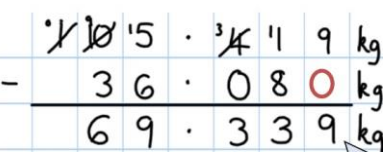
# Y2 SUBTRACTION -

Objective & Strategy	Concrete	Pictorial	Abstract
Subtracting a multiple of 10	 <p><math>32 - 10 = 22</math> Children use dienes, PV counters or Numicon. They remove the correct number of tens</p>	 <p>Children draw rods and cubes and cross off multiples of ten.</p>	$64 - 10 = \square$ $64 - 20 = \square$ $64 - 30 = \square$ $64 - \square = 24$ $\square - 50 = 14$
Subtract a single digit from a two digit number  No regrouping	 <p>Explore that <math>9 - 3 = 6</math> so <math>29 - 3 = 26</math> etc</p>	 <p><math>9 - 3 = 6</math> <math>19 - 3 = 16</math></p>	$9 - 3 = 6$ $19 - 6 = 13$ $29 - 6 = 23$ etc
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>	<p><math>20 - 4 = 16</math></p> 	<p><math>20 - 4 = 16</math></p>
Partitioning to subtract without regrouping.  <i>'Friendly numbers'</i>	<p><math>34 - 13 = 21</math></p>  <p>Use Dienes to show how to partition the number when subtracting without regrouping.</p>	<p><math>43 - 21 = 22</math></p> <p>Children draw representations of Dienes and cross off.</p> 	<p><math>43 - 21 = 22</math></p>

# Y2 SUBTRACTION -

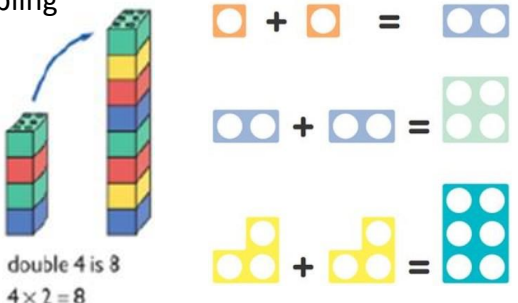
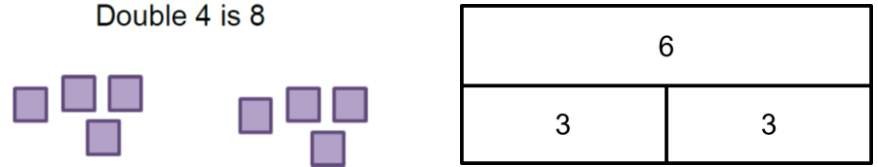

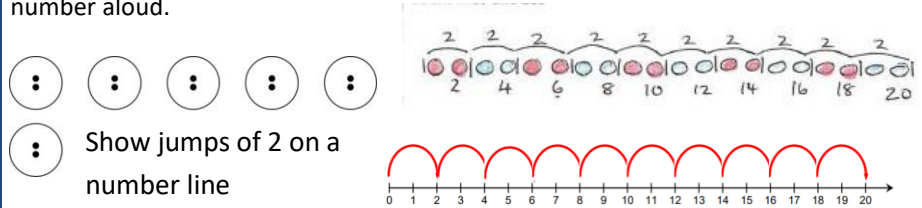
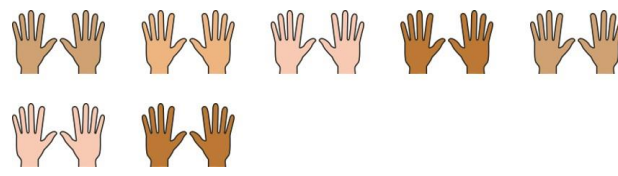
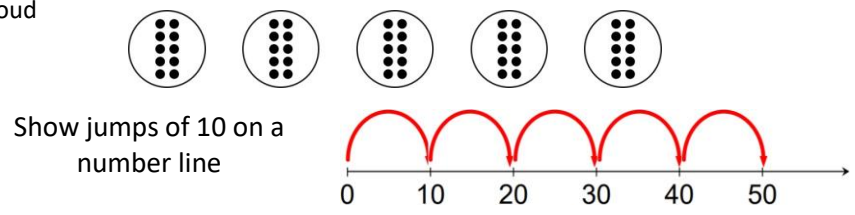

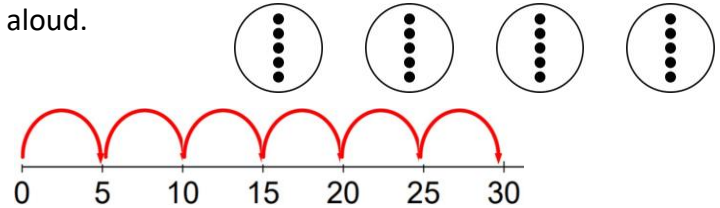
Objective & Strategy	Concrete	Pictorial	Abstract
<p>Column subtraction without regrouping (friendly numbers)</p>	 <p>47-32</p> <p>Use base 10 or Numicon to model</p>	 <p>Calculations</p> $\begin{array}{r} 54 \\ - 22 \\ \hline 32 \end{array}$ <p>Draw representations to support understanding</p>	<p>Intermediate step may be needed to lead to clear subtraction understanding.</p> $47 - 24 = 23$ $\begin{array}{r} 40 + 7 \\ - 20 + 4 \\ \hline 20 + 3 \end{array}$ <p>Leading to compact method.</p> 
<p>Column subtraction with regrouping</p>	 <p>Begin with base 10 or Numicon. Move to pv counters, modelling the exchange of a ten into ten ones. Use the phrase 'take and make' for exchange.</p>	 <p>Children may draw base ten or PV counters and cross off.</p>	<p>Begin by partitioning into pv columns</p>  <p>Then move to formal method.</p> 

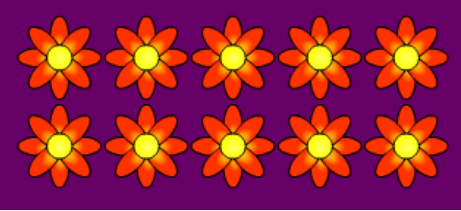
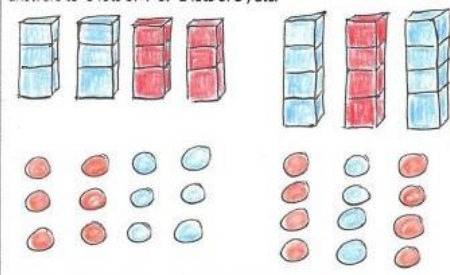
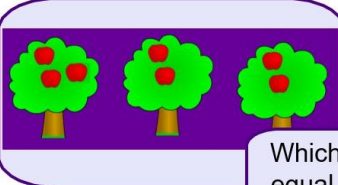

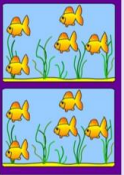
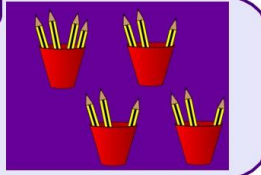
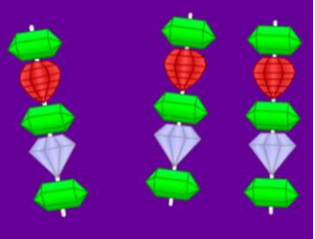
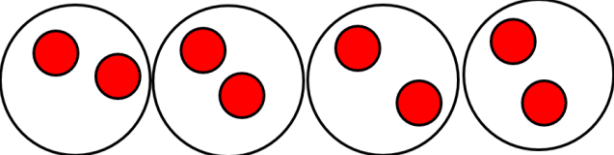
# Y3 SUBTRACTION-

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 -

# Y1 MULTIPLICATION X

Objective & Strategy	Concrete	Pictorial
<p>Double numbers to 10</p>	<p>Use practical activities using manipulatives including cubes and Numicon to demonstrate doubling</p> 	<p>Draw pictures and bar models to show how to double numbers</p> <p>Double 4 is 8</p> 
<p>Counting in groups of 2</p>	<p>Count in 2s using real life objects and contexts.</p> 	<p>Children make representations to show counting in multiples of 2. Count in multiples of a number aloud.</p> 
<p>Counting in groups of 10</p>	<p>Use real life objects and contexts to count in groups of 10</p> 	<p>Use and draw representations for counting in multiples of 10. Count in multiples of 10 aloud</p> 
<p>Counting in groups of 5</p>	<p>Use real life objects and contexts to count in groups of 5</p> 	<p>Use and draw representations for counting in multiples of 5. Count in 5s aloud.</p> 


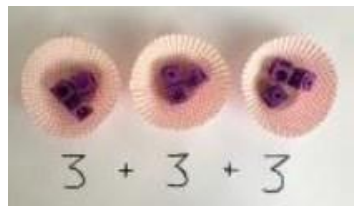
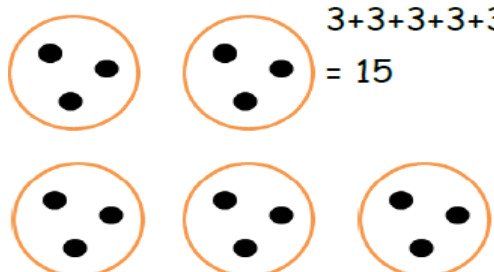
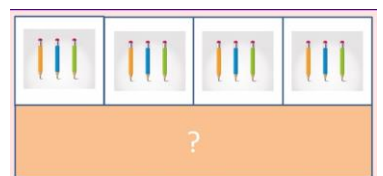
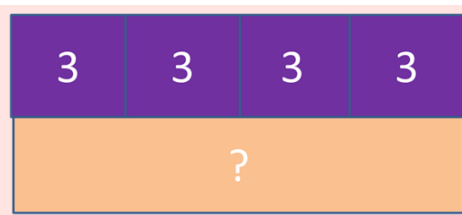
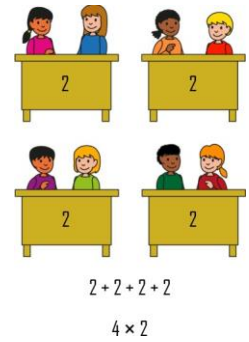

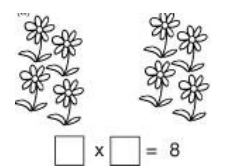
Objective & Strategy	Concrete	Pictorial
<p>Understand and use arrays</p>	<p>Use objects laid out in arrays to find the answers to 2 lots of 5, 3 lots of 2 etc.</p> 	<p>Make and draw representations of arrays to show understanding</p> 
<p>Equal/non equal groups</p>	<p>Use real life objects and contexts to examine equal and non-equal groups.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid purple; border-radius: 15px; padding: 5px; width: 150px; height: 100px; background-color: #e6e6fa;">  </div> <div style="border: 1px solid purple; border-radius: 15px; padding: 5px; width: 150px; height: 100px; background-color: #e6e6fa;">  </div> </div> <div style="border: 1px solid purple; border-radius: 15px; padding: 5px; width: 150px; height: 100px; background-color: #e6e6fa; margin: 5px 0;">  </div> <div style="border: 1px solid purple; border-radius: 15px; padding: 5px; width: 150px; height: 100px; background-color: #e6e6fa;">  </div> <div style="border: 1px solid purple; border-radius: 15px; padding: 5px; width: 150px; height: 100px; background-color: #e6e6fa; margin: 5px 0;">  </div> <div style="text-align: center; margin-top: 10px;"> <p>Which shows equal groups?</p> <p>There are 3 equal groups. There are 5 in each group.</p> </div>	<p>Children make/match representations of real life problems to show equal groups and find the total.</p>  <p>There are 4 equal groups. There are 2 in each group. There are 8 altogether.</p>

# Y1

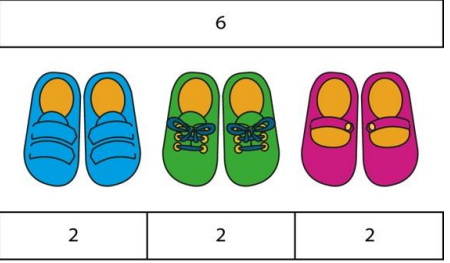
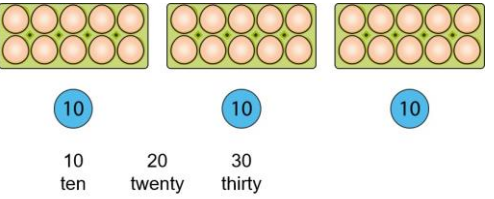
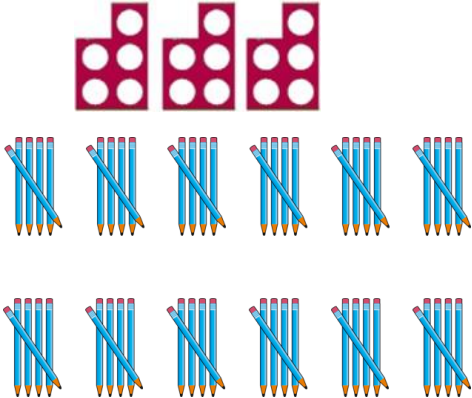

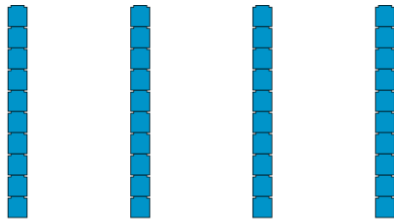
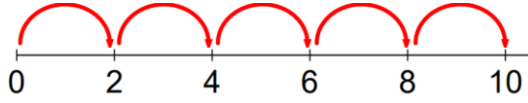

# MULTIPLICATION X

# Y2 MULTIPLICATION X

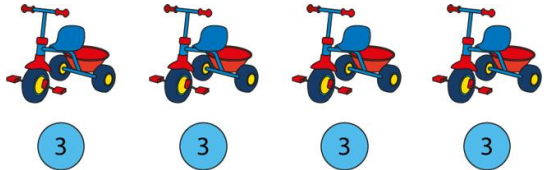
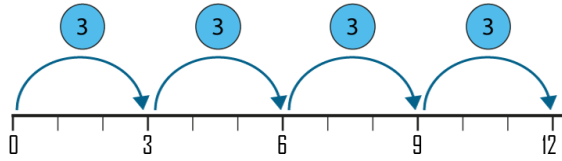
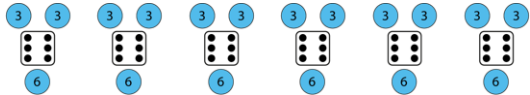
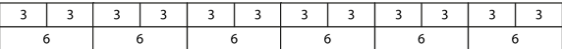
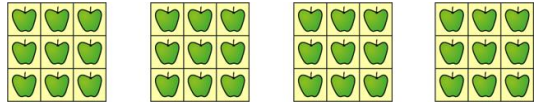
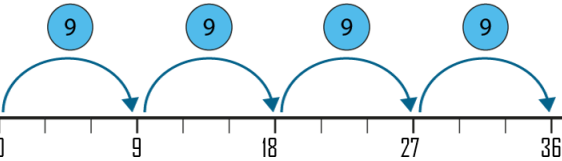
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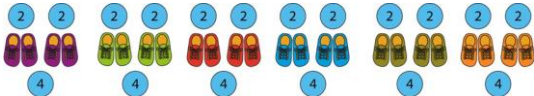
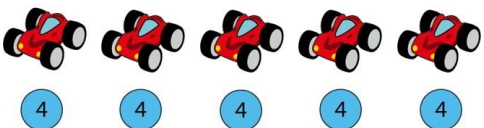
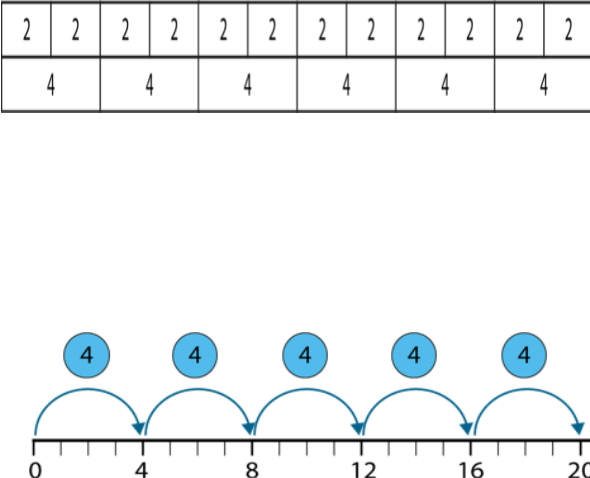
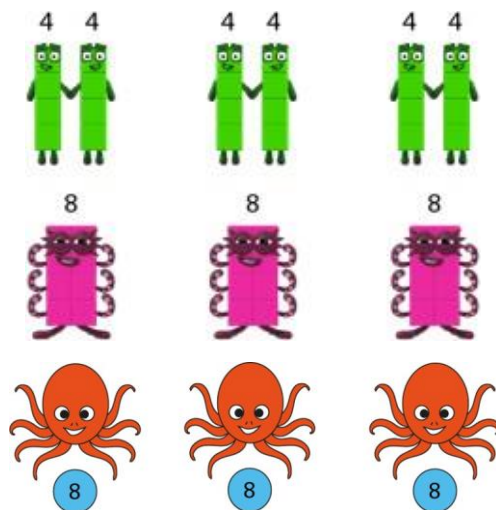
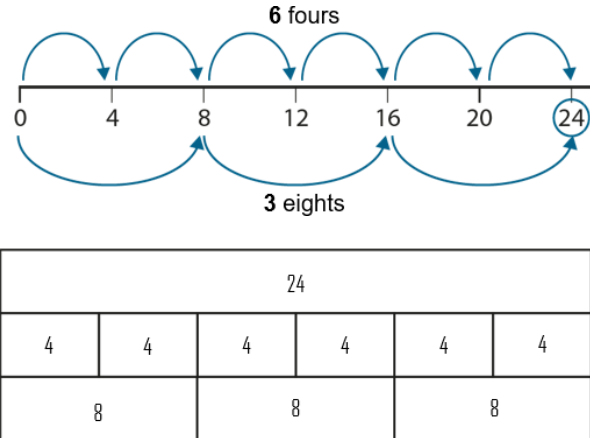
Objective & Strategy	Concrete	Pictorial	Abstract
<p>Use repeated addition for multiplications</p>	<p>Use objects and real life contexts.</p>  <p><math>2 + 2 + 2 + 2 + 2 = 10</math></p> <p>There are 5 groups of 2. There are 10 socks altogether.</p>  <p><math>3 + 3 + 3</math></p> <p>There are 3 groups of 3. There are 9 altogether.</p>	<p>Make and draw representations to show repeated addition</p> <p>There are 3 sweets in one bag. How many sweets are in 5 bags altogether?</p> <p><math>3 + 3 + 3 + 3 + 3 = 15</math></p>  <p>Use bar models for representations of repeated additions.</p> 	<p>Create number sentences using repeated addition to match representations.</p>  <p><math>3 + 3 + 3 + 3 = 12</math></p>
<p>Relate repeated addition to multiplication using the x sign.</p>	<p>Write multiplication sentences to match repeated addition.</p>  <p><math>2 + 2 + 2 + 2</math> <math>4 \times 2</math></p>	<p>Children make and draw representations and record both an addition sentence and a multiplication sentence.</p>  <p><math>1 + 1 + 1 + 1 + 1 + 1 = 6</math></p> <p><math>6 \times 1 = 6</math></p>  <p><math>\square \times \square = 8</math></p>	<p>Write multiplication sentences to match repeated addition, without the support of representations.</p> <p><math>2 + 2 + 2 + 2 + 2 = 10</math> <math>5 \times 2 = 10</math></p>

# Y2 MULTIPLICATION X

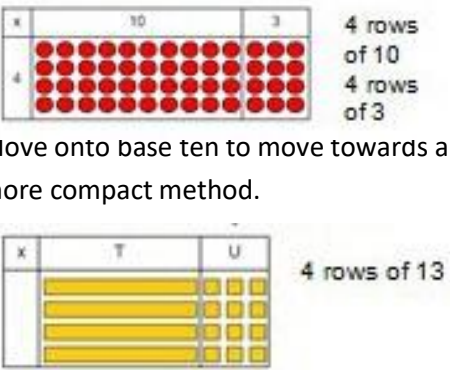
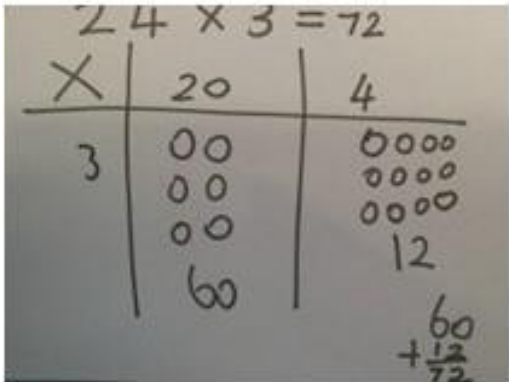
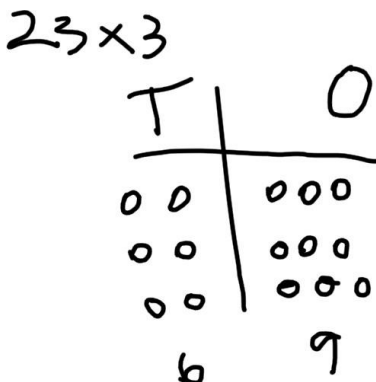
Objective & Strategy	Concrete	Pictorial	Abstract																				
<p>Understand the 2, 5 and 10 times table</p>	<p>Use objects and real life contexts for multiples of 2, 5 and 10</p>  <p><math>3 \times 2 = 6</math> <math>6 = 3 \times 2</math></p>  <p><math>3 \times 10 = 30</math></p> 	<p>Make and draw representations for 2, 5 and 10 times tables</p>  <p><math>12 = 6 \times 2</math></p>  <p><math>4 \times 10 = 40</math></p> <p>Number lines, bead strings, counting sticks and bar models should be used to show representation of counting in multiples.</p>  <p><math>5 \times 2 = 10</math></p> 	<p>Understand the terms factor and product</p> <table border="1" data-bbox="1456 335 1948 422"> <tr> <td>3</td> <td>×</td> <td>2</td> <td>=</td> <td>6</td> </tr> <tr> <td>factor</td> <td>×</td> <td>factor</td> <td>=</td> <td>product</td> </tr> </table> <table border="1" data-bbox="1456 478 1948 566"> <tr> <td>6</td> <td>=</td> <td>3</td> <td>×</td> <td>2</td> </tr> <tr> <td>product</td> <td>=</td> <td>factor</td> <td>×</td> <td>factor</td> </tr> </table> <p>Count in multiples of a number aloud.</p>	3	×	2	=	6	factor	×	factor	=	product	6	=	3	×	2	product	=	factor	×	factor
3	×	2	=	6																			
factor	×	factor	=	product																			
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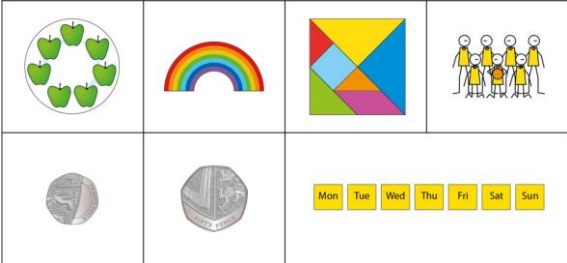
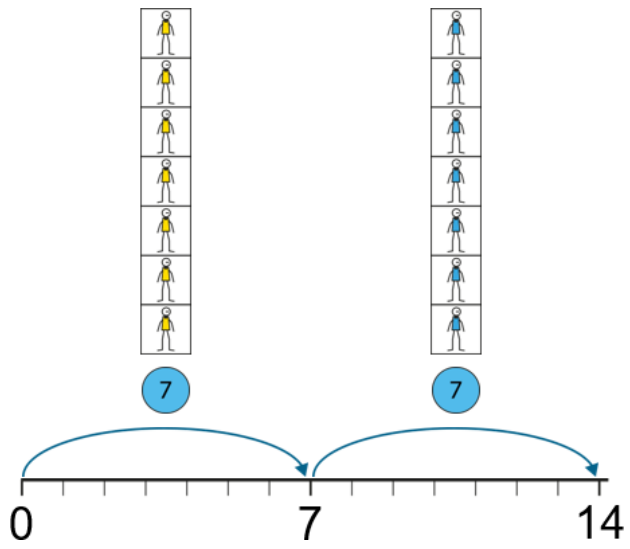
# Y2 MULTIPLICATION X

Objective & Strategy	Concrete	Pictorial	Abstract
<p><i>Understand the 3 times table</i></p>	<p>Count in three using objects and representations of multiples of 3.</p> 		<p>There are 12 wheels.</p> $4 \times 3 = 12$ $3 \times 4 = 12$
<p><i>Understand the 6 times table</i></p>	<p>We can double our 3 times table to find our 6 times table.</p> 		$12 \times 3 = 36$ $6 \times 6 = 36$
<p><i>Understand the 9 times table</i></p>	<p>Count in nines using objects and representations of multiples of 9. Make links 9 being three groups of three.</p> 		<p>There are 36 apples.</p> $4 \times 9 = 36$ $9 \times 4 = 36$

Objective & Strategy	Concrete	Pictorial	Abstract
<p><i>Understand the 4 times table</i></p>	<p>We can double our 2 times table to get the 4 times table</p>  <p>Pupils revise 2 times table from year 2 and make link that this can be doubled to obtain 4 times table.</p> <p>How many wheels? Count in groups of 4.</p> 		<p><math>12 \times 2 = 24</math></p> <p><math>6 \times 2 = 24</math></p> <p>There are 20 wheels.</p> <p><math>5 \times 4 = 20</math></p> <p><math>4 \times 5 = 20</math></p>
<p><i>Understand the 8 times table</i></p>	<p>We can double our 4 times table to get the 8 times table</p> 		<p><math>6 \times 4 = 24</math></p> <p><math>3 \times 8 = 24</math></p>

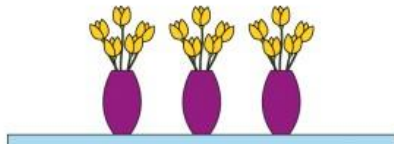
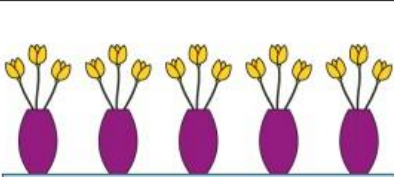
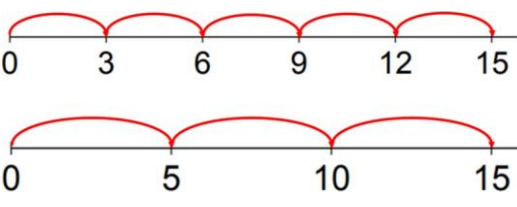
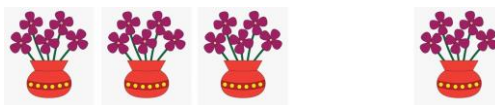

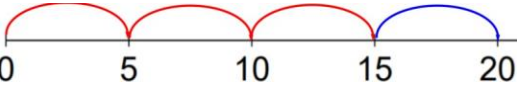

Divisibility rules in 'families' – 2, 4 and 8	
2	A number is divisible by 2 if the ones digit is even.
4	If halving a number gives an even value, then the number is divisible by 4. <i>and</i> For numbers with more than two digits: if the final two digits are divisible by 4 then the number is divisible by 4.
8	If halving a number twice gives an even value, the number is divisible by 8.


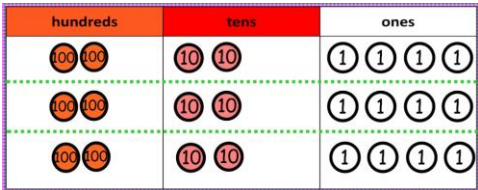
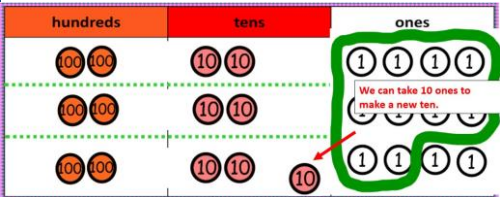
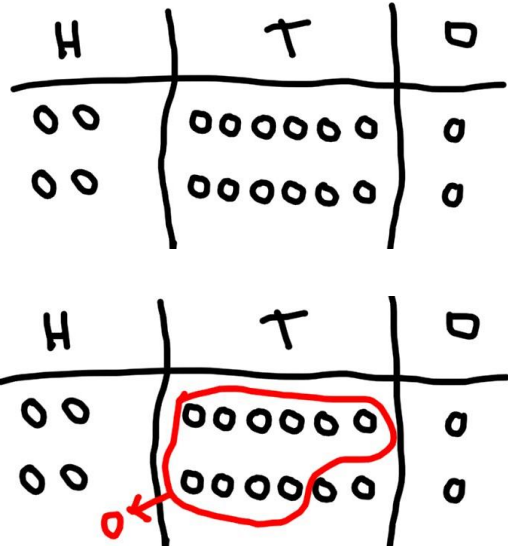
Objective & Strategy	Concrete	Pictorial	Abstract								
<p>Multiplying 2-digit by 1 digit using partitioning (distributive law)</p>	<p>Show the links with arrays to illustrate the PV partitioning</p>  <p>4 rows of 10 4 rows of 3</p> <p>Move onto base ten to move towards a more compact method.</p> <p>4 rows of 13</p> <p>Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows</p>	<p>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> 	$4 \times 10 = 40$ $4 \times 3 = 12$ $40 + 12 = 52$								
<p>2 digit x 1 digit using PV counters (no regrouping)</p>	<p>23 x 3</p> <table border="1" data-bbox="481 1005 869 1332"> <thead> <tr> <th>tens</th> <th>ones</th> </tr> </thead> <tbody> <tr> <td>10 10</td> <td>1 1 1</td> </tr> <tr> <td>10 10</td> <td>1 1 1</td> </tr> <tr> <td>10 10</td> <td>1 1 1</td> </tr> </tbody> </table> <p>Chn can see array in the ones and the tens. There is a visual link to repeated addition.</p>	tens	ones	10 10	1 1 1	10 10	1 1 1	10 10	1 1 1	<p>Children practice, drawing their representations.</p> 	$\begin{array}{r} 23 \\ \times 3 \\ \hline 69 \end{array}$
tens	ones										
10 10	1 1 1										
10 10	1 1 1										
10 10	1 1 1										


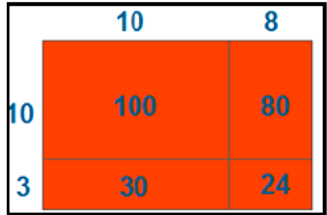
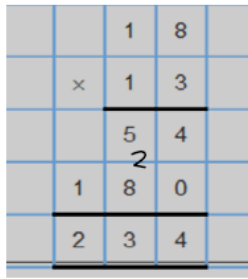
Objective & Strategy	Concrete	Pictorial	Abstract
<p>Understand the 7 times table</p>	<p>Children use representations which show groups of 7 including real life contexts.</p> 	<p>Linear models show jumps of 7.</p> 	<p>There are 14 players.</p> $2 \times 7 = 14$ $7 \times 2 = 14$

**Y4**

**MULTIPLICATION X**

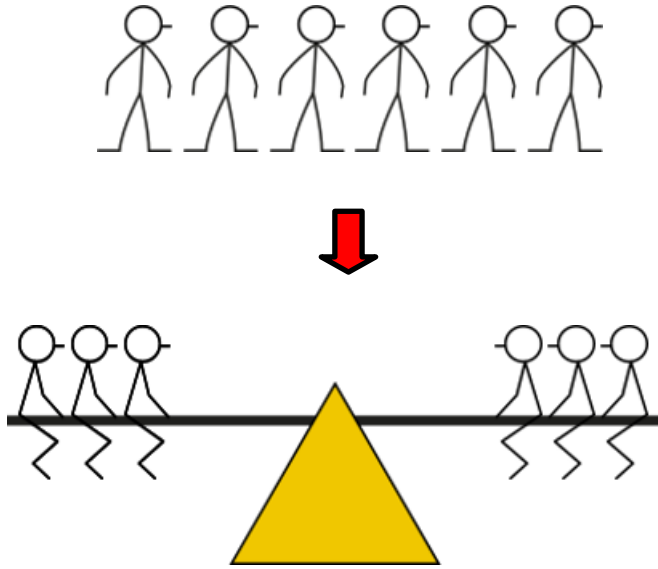
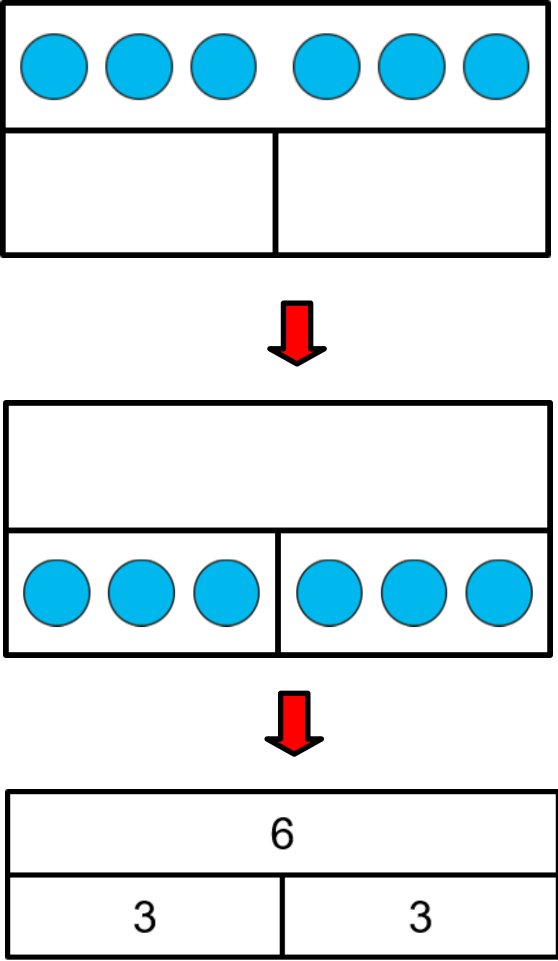
Objective & Strategy	Concrete	Pictorial	Abstract
<p>Understanding the commutative law.</p>	<p><b>A</b></p>  <ul style="list-style-type: none"> <li>• 'Three groups of five are equal to fifteen.'</li> <li>• 'Five, three times is equal to fifteen.'</li> </ul> <p><b>B</b></p>  <ul style="list-style-type: none"> <li>• 'Five groups of three are equal to fifteen.'</li> </ul> <p>"Three groups of five is equal to five groups of three."</p>		<p><math>3 \times 5 = 15</math></p> <p><math>5 \times 3 = 15</math></p> <p><math>5 \times 3 = 3 \times 5 = 15</math></p> <p><math>15 \div 3 = 5</math></p> <p><math>15 \div 5 = 3</math></p>
<p>Understanding the distributive law</p>	 	 	<p><math>4 \times 5 = 3 \times 5 + 5 = 20</math></p> <p><math>4 \times 5 = 5 \times 5 - 5 = 20</math></p>

Objective & Strategy	Concrete	Pictorial	Abstract
<p>Multiply 3 digit numbers by 1 digit. (no exchange)</p>	<p>Use place value counters to show how we are finding groups of a number. We are multiplying by 3 so we need 3 rows</p> <p><math>123 \times 3 = 369</math></p>  <p style="text-align: center;">300 + 60 + 9</p> <p>Add up each column, starting with the ones.</p>	<p>Children can represent their work with place value counters by drawing place value counters or Dienes.</p>	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <math display="block">\begin{array}{r} 231 \\ \times 3 \\ \hline 693 \end{array}</math> </div> <div> <p>3 x 1 <i>ones</i> is three ones</p> <p>3 x 3 <i>tens</i> is nine tens</p> <p>3 x 2 <i>hundreds</i> is six hundreds</p> </div> </div>
<p>Multiply 3 digit numbers by 1 digit. (with exchange)</p>	<p><math>224 \times 3</math></p>  <p style="text-align: center;">600 + 70 + 2</p> <p>Regroup ten ones to make a new ten.</p>  <p style="text-align: center;">600 + 70 + 2</p> <p style="text-align: center;">+672</p>	<p><math>261 \times 2</math></p>  <p style="text-align: center;">500 + 20 + 2</p> <p style="text-align: center;">+522</p>	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <math display="block">\begin{array}{r} 241 \\ \times 4 \\ \hline 964 \\ 1 \end{array}</math> </div> <div> <p>4 times 1 <i>ones</i> is 4 ones</p> <p>4 times 4 <i>tens</i> is 16 tens. I put 6 tens down and carry ten tens which is now a hundred.</p> <p>4 times 2 <i>hundreds</i> is 8 hundreds. I add the hundred I have carried to make 9 hundreds.</p> </div> </div>

Objective & Strategy	Concrete	Pictorial	Abstract																														
<p>Multiply 3 and 4 digits x 1 digit.</p>	<p>Children may continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping.</p> <p>3024 x 3</p>  <p>900 + 0 + 60 +</p>	<p>Children may continue to draw their understanding using place value grids.</p>	$\begin{array}{r} 3024 \\ \times \quad 3 \\ \hline 9072 \end{array}$																														
<p>Multiply up to 4 digits by 2 digits</p>	<p>Manipulatives may still be used with the corresponding long multiplication modelled alongside.</p> <p>Begin with teen number x teen number.</p> <p>Progress to any 2 –4 digit number x 2 digit.</p>		 <p>18 x 3 on the first row</p> <p>(8 x 3 = 24, carrying the 2 for 20, then 1 x 3)</p> <p>18 x 10 on the 2nd row. Show multiplying by 10 by putting zero in units first</p> <table border="1" data-bbox="1556 1165 1713 1476"> <thead> <tr> <th></th> <th>100s</th> <th>10s</th> <th>1s</th> <th></th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>3</td> <td>1</td> <td></td> </tr> <tr> <td>x</td> <td></td> <td>2</td> <td>4</td> <td></td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>4</td> <td>31 x 4</td> </tr> <tr> <td></td> <td>6</td> <td>2</td> <td>0</td> <td>31 x 20</td> </tr> <tr> <td></td> <td>7</td> <td>4</td> <td>4</td> <td></td> </tr> </tbody> </table>		100s	10s	1s				3	1		x		2	4			1	2	4	31 x 4		6	2	0	31 x 20		7	4	4	
	100s	10s	1s																														
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x		2	4																														
	1	2	4	31 x 4																													
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	7	4	4																														

Objective & Strategy	Concrete	Pictorial	Abstract
Multiply decimals up to 2 decimal places by a single digit			$  \begin{array}{r}  2.38 \\  \times \quad 3 \\  \hline  714 \\  \text{1 2}  \end{array}  $ <p>First we lay out the calculation</p> <p>Next, we write the decimal point in the answer (product).</p> <p>Finally, we carry out the multiplication.</p> <p><i>3 x 8 hundredths is 24 hundredths</i></p> <p><i>3 x 3 tenths is 9 tenths, add 2 tenths we carried is 11 tenths</i></p> <p><i>3 x 3 ones is 6 ones, add 1 one we carried is 7 ones</i></p>
Multiply up to 4 digit numbers by 2 digits.			$  \begin{array}{r}  \phantom{\times} \phantom{312} \cancel{1} \\  \phantom{\times} \phantom{312} 312 \\  \times \phantom{312} 28 \\  \hline  2496 \\  6240 \\  \hline  8736 \\  \hline  1  \end{array}  $

# Y6 MULTIPLICATION X

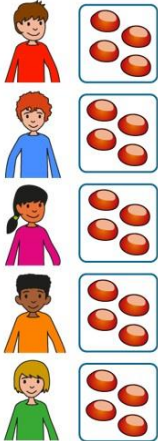
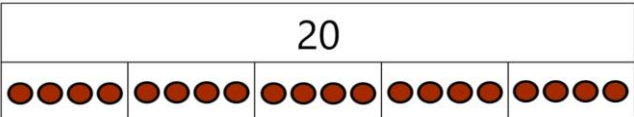
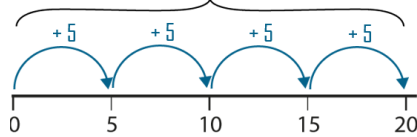
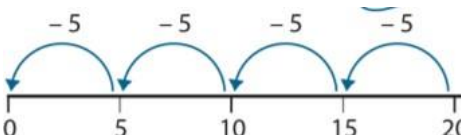
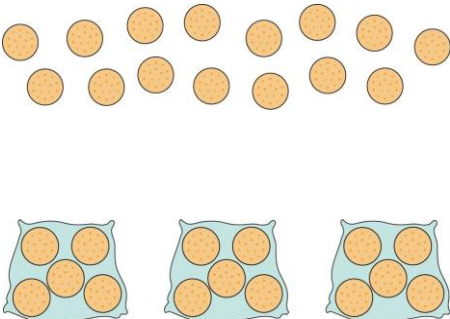
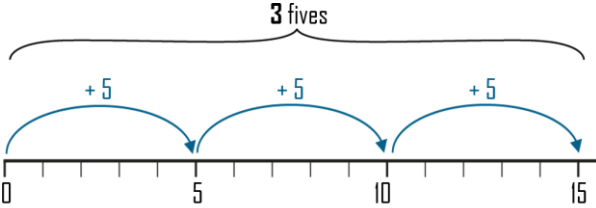
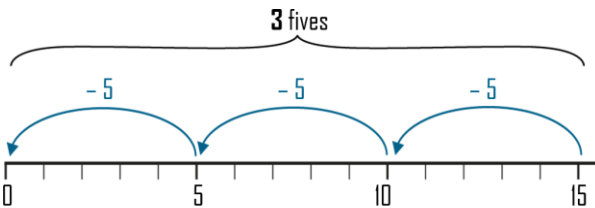
Objective & Strategy	Concrete	Pictorial
<p>Find half of numbers to 20.</p>	<p>Real life and practical contexts are used to find half of numbers up to 20.</p> 	<p>Children use manipulatives to represent real life problems.</p>  <p>half of 6 = 3 double 3 = 6</p>

Y1

DIVISION



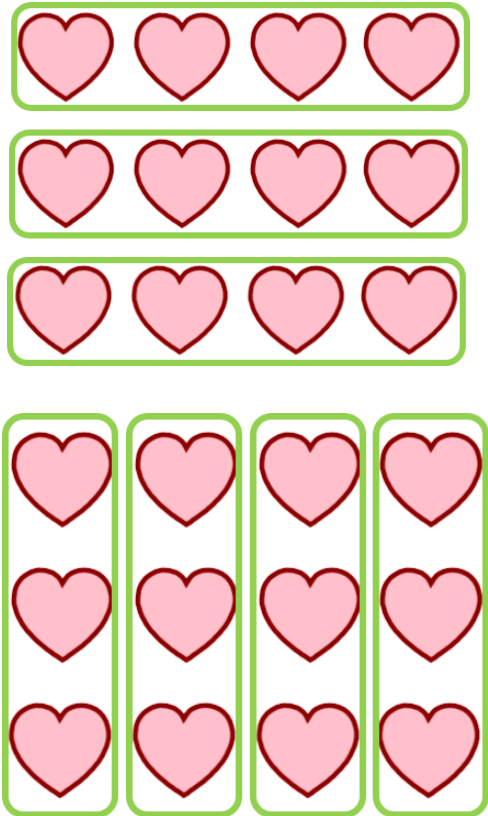
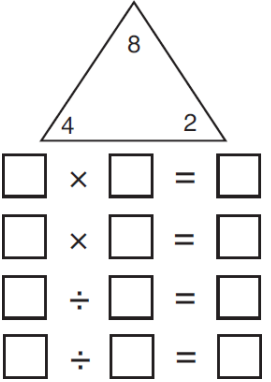


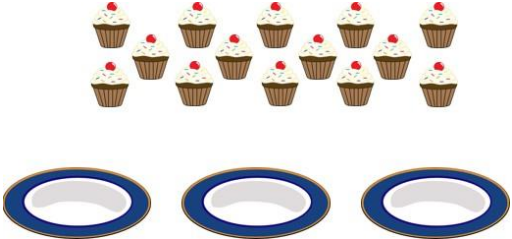
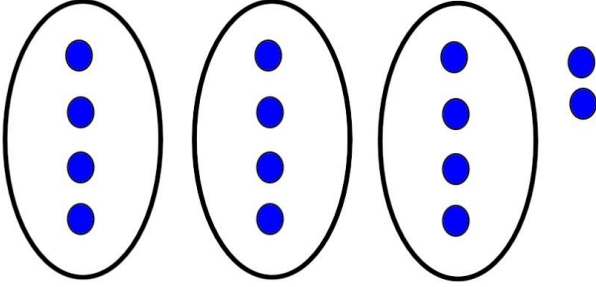


Objective & Strategy	Concrete	Pictorial	Abstract
Division as sharing (partitive)	<p>There are 20 conkers shared equally between 5 children.</p>  <p>Each child gets 4 conkers.</p>	<p>Children use pictures or shapes to share quantities. They may use bar modelling to show and support understanding.</p>  <p>Number lines are used to show skip counting (counting forwards)</p>  <p>and repeated subtraction (counting backwards).</p> 	$20 \div 5 = 4$
Division as grouping (quotitive)	<p>Use cubes, counters or real objects or to aid understanding.</p> <p>There are 15 biscuits, there are 5 in each bag. How many bags?</p> 	 <p>3 fives</p> $5 + 5 + 5 = 15$ $15 \div 5 = 3$  <p>3 fives</p> $15 - 5 - 5 - 5 = 0$ $15 \div 5 = 3$	<p>15 divided into groups of 5 is 3</p> $15 \div 5 = 3$

# Y2

# DIVISION



Objective & Strategy	Concrete	Pictorial	Abstract
Understanding the Inverse	 <p>The concrete section shows two sets of hearts. The first set consists of three rows, each containing four hearts, representing the multiplication <math>3 \times 4 = 12</math> and the division <math>12 \div 4 = 3</math>. The second set consists of four columns, each containing three hearts, representing the multiplication <math>4 \times 3 = 12</math> and the division <math>12 \div 3 = 4</math>.</p>	 <p>The pictorial section features a triangle with the number 8 at the top vertex, 4 at the bottom-left vertex, and 2 at the bottom-right vertex. Below the triangle are four rows of empty boxes for fact families: <math>\square \times \square = \square</math>, <math>\square \times \square = \square</math>, <math>\square \div \square = \square</math>, and <math>\square \div \square = \square</math>.</p>	<p><math>3 \times 4 = 12</math>  <math>12 \div 4 = 3</math></p> <p><math>4 \times 3 = 12</math>  <math>12 \div 3 = 4</math></p> <p><math>2 \times 4 = 8</math>      <math>4 \times 2 = 8</math>  <math>8 \div 2 = 4</math>      <math>8 \div 4 = 2</math>  <math>8 = 2 \times 4</math>      <math>8 = 4 \times 2</math>  <math>2 = 8 \div 4</math>      <math>4 = 8 \div 2</math></p> <p>Show all 8 related fact family sentences.</p>

Objective & Strategy	Concrete	Pictorial	Abstract										
Division with remainders. (partitive)	I divide 14 cakes between 3 plates. How are the cakes shared? 	Draw dots and group them to divide an amount and clearly show a remainder. 	Complete written divisions and show the remainder using r. $14 \div 3 = 4 \text{ r } 2$ <div style="display: flex; justify-content: space-around; width: 100%;"> <span>↓ dividend</span> <span>↓ divisor</span> <span>↓ quotient</span> <span>↓ remainder</span> </div>										
Division with remainders. (quotitive)	13 eggs are put into boxes. Each box holds 3 eggs. How are the eggs boxed? 	Children may draw representations to show their understanding.  Use bar models to show division with remainders. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td colspan="5" style="text-align: center;">13</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> <td style="text-align: center;">1</td> </tr> </table>	13					3	3	3	3	1	$13 \div 3 = 4 \text{ r } 1$
13													
3	3	3	3	1									

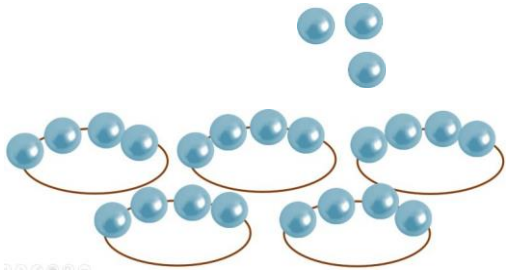
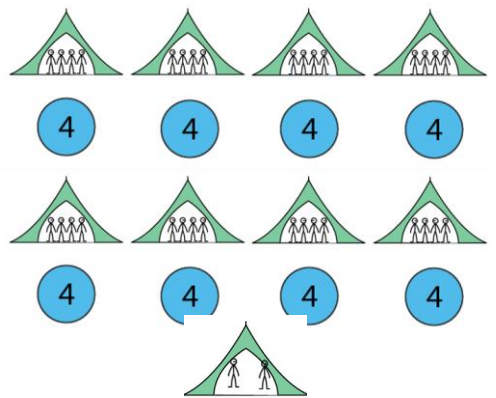
# Y3

# DIVISION ÷

Divisibility rules in 'families' – 3, 6 and 9	
<b>3</b>	For a number to be divisible by 3, the sum of the digits of the number must be divisible by 3.
<b>6</b>	For a number to be divisible by 6, the number must be divisible by <i>both 2 and 3</i> .
<b>9</b>	For a number to be divisible by 9, the sum of the digits of the number must be divisible by 9.

Divisibility rules in 'families' – 5 and 10	
<b>5</b>	A number is divisible by 5 if the ones digit is 5 or 0.
<b>10</b>	A number is divisible by 10 if the ones digit is 0.

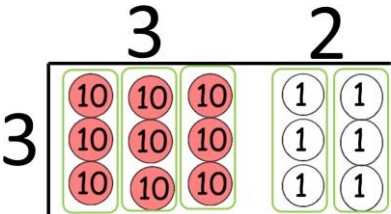
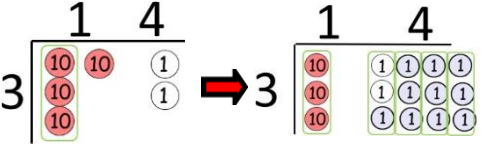
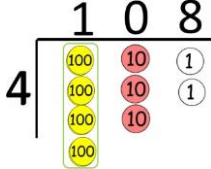
**Y3****DIVISION**  
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Objective & Strategy	Concrete	Pictorial	Abstract																
<p>Interpreting division with remainders.</p>	<p>Bracelets are made using 4 beads. There are 23 beads. How many bracelets can be made? How many beads left over?</p> 	<p>Bar model representations may be used.</p> <table border="1" data-bbox="896 327 1500 454"> <tr> <td colspan="6">23</td> </tr> <tr> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>3</td> </tr> </table>	23						4	4	4	4	4	3	<p><math>23 \div 4 = 5 \text{ r } 3</math></p>				
23																			
4	4	4	4	4	3														
<p>Interpreting division with remainders.</p>	<p>4 scouts can fit in each tent. How many tents needed for 30 scouts?</p> 	<table border="1" data-bbox="896 869 1500 997"> <tr> <td colspan="8">30</td> </tr> <tr> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>2</td> </tr> </table>	30								4	4	4	4	4	4	4	2	<p><math>30 \div 4 = 7 \text{ r } 2</math></p> <p>8 tents are needed.</p> <p>Discuss with pupils the need to round up in this context.</p>
30																			
4	4	4	4	4	4	4	2												

**Y** 4

# DIVISION



Objective & Strategy	Concrete	Pictorial	Abstract
<p>Divide 2 and 3 digit numbers by 1 digit.</p> <p>Short Division</p>	<p><math>96 \div 3</math></p> <p>Use place value counters to make groups of the divisor, starting with the largest value digit.</p>  <p>There are 3 groups of 3 tens.</p> <p>There are 2 groups of 3 ones.</p> <p><math>42 \div 3</math></p>  <p>There is 1 group of 3 tens. There is a ten left over. We exchange this for 10 ones. 12 ones divided by 3 is 4</p> <p><math>432 \div 4</math></p>  <p>There is 1 group of 4 hundreds. There are no groups of 4 tens and three tens left over.</p> <p>There are 8 groups of 4 ones.</p>	<p>Students use drawn diagrams with dots or circles to show their understanding.</p>	<p>Begin with divisions that divide equally with no remainder.</p> $  \begin{array}{r}  124 \\  3 \overline{) 372} \\  \underline{3} \phantom{0} \\  7 \phantom{0} \\  \underline{6} \phantom{0} \\  12 \\  \underline{12} \\  0  \end{array}  $ <p>Move onto divisions with a remainder. Return to concrete if necessary.</p> $  \begin{array}{r}  138 \text{ r } 3 \\  4 \overline{) 527} \\  \underline{4} \phantom{0} \\  12 \phantom{0} \\  \underline{12} \phantom{0} \\  7 \\  \underline{4} \\  3  \end{array}  $

Y4

DIVISION



Divisibility rules in numerical order	
2	A number is divisible by 2 if the ones digit is even.
3	For a number to be divisible by 3, the sum of the digits of the number must be divisible by 3.
4	If halving a number gives an even value, then the number is divisible by 4. <i>and</i> For numbers with more than two digits: if the final two digits are divisible by 4 then the number is divisible by 4.
5	A number is divisible by 5 if the ones digit is 5 or 0.
6	For a number to be divisible by 6, the number must be divisible by <i>both 2 and 3</i> .
8	If halving a number twice gives an even value, the number is divisible by 8.
9	For a number to be divisible by 9, the sum of the digits of the number must be divisible by 9.
10	A number is divisible by 10 if the ones digit is 0.

Y4

DIVISION ÷



## Division of 2 digits by 2 digits

Using  $\times$  &  $\div$  by 10, 100 etc and relating this to a short division method.

$$\begin{array}{ccccccc}
 60 & \div & 30 & = & \boxed{2} & & \\
 \downarrow \div 10 & & \downarrow \div 10 & & \curvearrowright & & \\
 6 & \div & 3 & = & 2 & & 
 \end{array}$$

$$\begin{array}{r}
 0 \quad 2 \\
 \hline
 30 \overline{) 6 \quad 60}
 \end{array}$$

## Long Division—2 digits divided by 2 digits

H T O

$$30 \overline{) 85}$$

30 does not go into 8.  
So, combine the 8  
tens with the 5 ones.

H T O

$$30 \overline{) 85} \begin{array}{r} 2 \\ 60 \end{array}$$

30 goes into 85 twice,  
which is 60.

H T O

$$30 \overline{) 85} \begin{array}{r} 2 \\ 60 \\ \hline 25 \end{array}$$

Subtract the 60 from  
the 85 and this leaves  
25.

H T O

$$30 \overline{) 85} \begin{array}{r} 2 \text{ r } 25 \\ 60 \\ \hline 25 \end{array}$$

85 divided by 30 is 2  
with a remainder of  
25

Y6

DIVISION



## Moving to Long division of 2 digits by 2 digits

Making a 'useful' list

H T O

$$31 \overline{) 434}$$

	X 31
1	31
2	
3	
4	
5	
6	
7	
8	
9	
10	

	X 31
1	31
2	62
3	
4	
5	
6	
7	
8	
9	
10	

Double 1x  
to find 2 x

	X 31
1	31
2	62
3	
4	
5	
6	
7	
8	
9	
10	310

Double 1x  
to find 2 x

x10

	X 31
1	31
2	62
3	
4	
5	155
6	
7	
8	
9	
10	310

Double 1x  
to find 2 x

Halve 10x  
to find 5 x

x10

	X 31
1	31
2	62
3	
4	124
5	155
6	
7	
8	
9	
10	310

Double 1x  
to find 2 x

Double 2x  
to find 4 x

Halve 10x  
to find 5 x

x10

	X 31
1	31
2	62
3	93
4	124
5	155
6	186
7	217
8	248
9	279
10	310

Double 1x  
to find 2 x

Double 2x  
to find 4 x

Halve 10x  
to find 5 x

x10

## Long Division—3 digits divided by 2 digits

$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ 31 \overline{) 4 \quad 3 \quad 4} \end{array}$$



$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ 0 \\ 31 \overline{) 4 \quad 3 \quad 4} \end{array}$$

31 does not go into 4 (hundreds).



$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ 0 \quad 1 \\ 31 \overline{) 4 \quad 3 \quad 4} \\ \underline{3 \quad 1} \end{array}$$

We combine the 4 hundreds with the tens to give 43 tens. 31 goes into 43 once which is 31, we record this underneath.



$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ 0 \quad 1 \\ 31 \overline{) 4 \quad 3 \quad 4} \\ \underline{3 \quad 1} \\ 1 \quad 2 \end{array}$$

Subtract to find the remainder. 31 from 43 leaves 12.

$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ 0 \quad 1 \\ 31 \overline{) 4 \quad 3 \quad 4} \\ \underline{3 \quad 1} \\ 1 \quad 2 \quad 4 \end{array}$$



$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ 0 \quad 1 \\ 31 \overline{) 4 \quad 3 \quad 4} \\ \underline{3 \quad 1} \\ 1 \quad 2 \quad 4 \\ \underline{1 \quad 2 \quad 4} \end{array}$$



$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ 0 \quad 1 \quad 4 \\ 31 \overline{) 4 \quad 3 \quad 4} \\ \underline{3 \quad 1} \\ 1 \quad 2 \quad 4 \\ \underline{1 \quad 2 \quad 4} \\ 0 \end{array}$$

We combine 12 with the next digit to give 124.

31 goes into 124 four times, which is 124.

We subtract to show there is no remainder

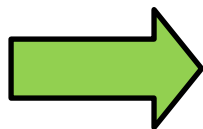
# Y6

# DIVISION



## Long Division—progressing to 4 or more digits

	TH	H	T	O
23	4	9	4	5



	TH	H	T	O
		2		
23	4	9	4	5
	4	6		
		3		



	TH	H	T	O
		2	1	
23	4	9	4	5
	4	6		
		3	4	
		2	3	
		1	1	

23 goes into 49 twice which is 46. We subtract this from 49 to give a remainder of 3.

We combine the 3 left over with the next digit to give 34. 23 goes into 34 once with 11 remaining.



	TH	H	T	O
		2	1	5
23	4	9	4	5
	4	6		
		3	4	
		2	3	
		1	1	5
		1	1	5
				0

We combine the 11 with the next digit to make 115. 23 goes into 115 5 times with no remainder.

# Y6

# DIVISION ÷

## Long Division—procedural summary (remainder in the tens)

Y6

DIVISION



1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
$\begin{array}{r} \text{t o} \\ 2 \phantom{0} \\ \underline{2) 58} \end{array}$ <p>Two goes into 5 two times, or 5 tens ÷ 2 = 2 whole tens -- but there is a remainder!</p>	$\begin{array}{r} \text{t o} \\ 2 \phantom{0} \\ \underline{2) 58} \\ -4 \phantom{0} \\ \hline 1 \phantom{0} \end{array}$ <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>	$\begin{array}{r} \text{t o} \\ 29 \\ \underline{2) 58} \\ -4 \phantom{0} \\ \hline 18 \end{array}$ <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.
$\begin{array}{r} \text{t o} \\ 29 \\ \underline{2) 58} \\ -4 \phantom{0} \\ \hline 18 \end{array}$ <p>Divide 2 into 18. Place 9 into the quotient.</p>	$\begin{array}{r} \text{t o} \\ 29 \\ \underline{2) 58} \\ -4 \phantom{0} \\ \hline 18 \\ \underline{-18} \\ 0 \end{array}$ <p>Multiply <math>9 \times 2 = 18</math>, write that 18 under the 18, and subtract.</p>	$\begin{array}{r} \text{t o} \\ 29 \\ \underline{2) 58} \\ -4 \phantom{0} \\ \hline 18 \\ \underline{-18} \\ 0 \end{array}$ <p>The division is over since there are no more digits in the dividend. The quotient is 29.</p>

## Long Division—procedural summary (remainder in any of the digits)

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>

# Y6

# DIVISION $\div$