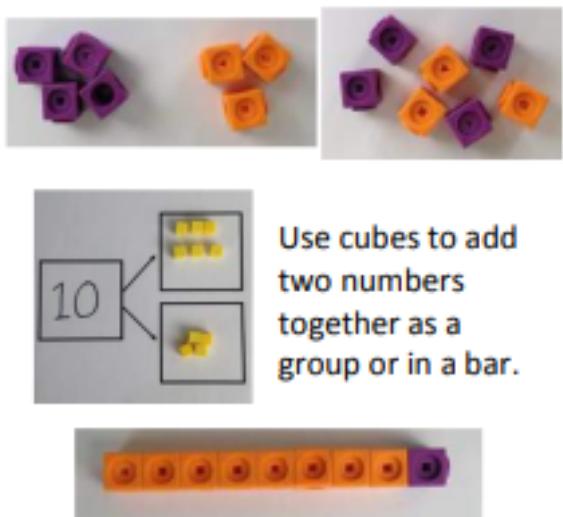
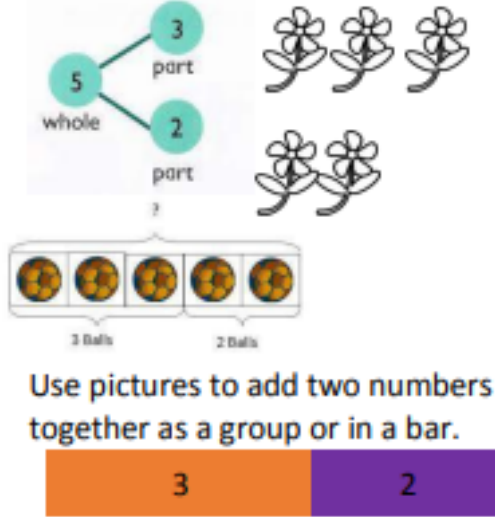

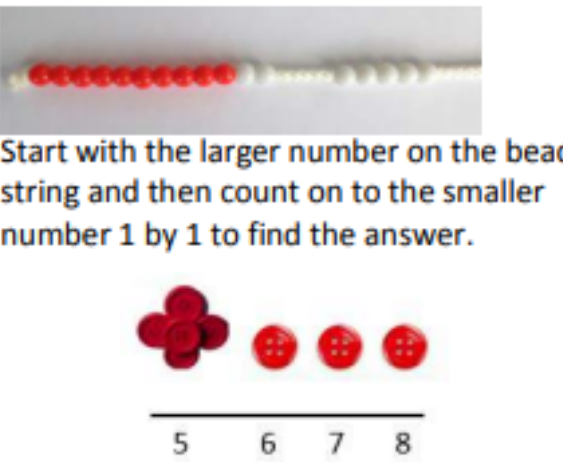

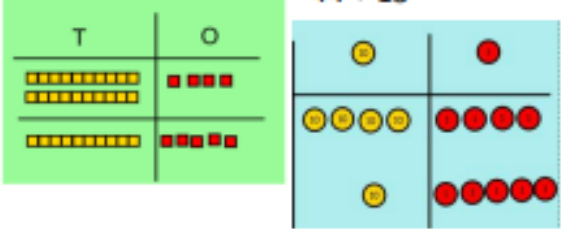
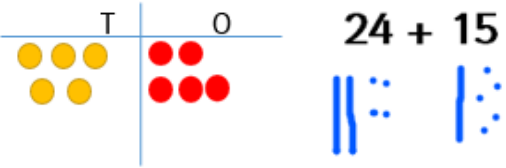
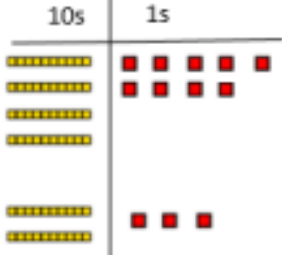
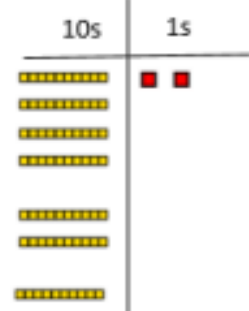
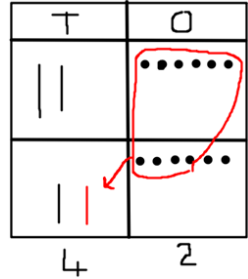


# Addition

	Objective	Concrete	Pictorial	Abstract
Year 1	Number bonds of 5, 6, 7, 8, 9 and 10	 <p>Use cubes to add two numbers together as a group or in a bar.</p>	 <p>Use pictures to add two numbers together as a group or in a bar.</p>	$2 + 3 = 5$ $3 + 2 = 5$ $5 = 3 + 2$ $5 = 2 + 3$  <p>Use the part-part-whole diagram as shown above to move into the abstract.</p>
	Counting	 <p>Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.</p>	<p>Use a number line to count on in ones.</p>  <p>Start at the larger number on the number line and count on in ones or in one jump to find the answer.</p> $12 + \text{4 dots} =$ <p>Addition by counting on – to prepare children to solve addition without relying on number lines</p>	$5 + 3 = 8$  $5 + 12 = 17$ <p>Place the larger number in your head and count on the smaller number to find your answer.</p>



# Addition

	Objective	Concrete	Pictorial	Abstract
Year 2	Column method without regrouping	<p>Add together the ones first, then add the tens. Use the Base 10 blocks first before moving onto place value counters.</p> <p><math>24 + 15 =</math></p> 	<p>After practically using the base 10 blocks and place value counters, children can draw the representations to help them to solve additions.</p> 	<p><math>24 + 15 = 39</math></p> $\begin{array}{r} 24 \\ + 15 \\ \hline 39 \end{array}$
	Column method with regrouping	<p>Make both numbers on a place value grid.</p>  <p>Add up the units and exchange 10 ones for 1 ten.</p> 	<p>To regroup using the method of drawing base ten, children start by drawing the number sentence in a tens and ones table..</p> <p>e.g. <math>26 + 12 =</math></p> <p>Children would then start by counting the ones. If they reach 10, they then circle the ten ones and draw an additional ten in the tens column. Children then count the remaining ones – write the number below and count the total tens and write the number below.</p> 	<p><math>40 + 9</math></p> <p><math>20 + 3</math></p> <p><math>60 + 12 = 72</math></p>

# Addition



	Objective	Concrete	Pictorial	Abstract
Year 3/4	Column method with regrouping	<p>Make both numbers on a place value grid.</p> <p>146 + 527</p> <p>Add up the units and exchange 10 ones for 1 ten.</p> <p>146 + 527</p> <p>As children move on to decimals, money and decimal place value counters can be used to support learning.</p> <p><b>NB</b> By Year 4 children will progress on to adding four digit numbers.</p>	<p>100s      10s      1s</p> <hr/>   <p>100s      10s      1s</p> <hr/>  <p>Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.</p> <p><b>NB</b> Addition of money needs to have £ and p added separately.</p>	<p>100 + 40 + 6 500 + 20 + 7 600 + 70 + 3 = 673</p> <p>As the children progress, they will move from the expanded to the compacted method.</p> <p>146 + 527 673</p> <p>1</p> <p>As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here.</p>
Year 5/6	Column method with regrouping	Consolidate understanding using numbers with more than 4 digits and extend by adding numbers with up to 3 decimal places.		

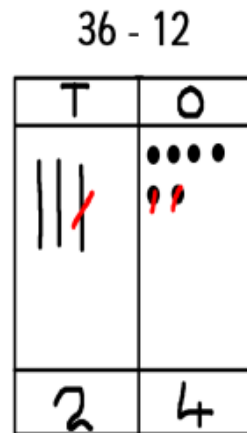
# Subtraction

	Objective	Concrete	Pictorial	Abstract
Year 1	Taking away ones	<p>Use physical objects, counters, cubes etc. to show how objects can be taken away.</p> <p><math>4 - 2 = 2</math></p>	<p>Cross out drawn objects to show what has been taken away.</p> <p><math>4 - 2 = 2</math></p>	<p><math>4 - 2 = 2</math></p>
	Counting back	<p>Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.</p> <p><math>13 - 4 = 9</math></p>	<p>Count back on a number line or number track</p> <p>Start at the bigger number and count back the smaller number, showing the jumps on the number line.</p>	<p>Put 13 in your head, count back 4. What number are you at? Use your fingers to help.</p>
	Find the difference	<p>Compare amounts and objects to find the difference.</p> <p>Use cubes to build towers or make bars to find the difference. Use basic bar models with items to find the difference.</p>	<p>Count on to find the difference.</p> <p>Lisa is 13 years old. Her sister is 22 years old. Find the difference in age between them.</p> <p>Draw bars to find the difference between 2 numbers.</p>	<p>Hannah has 8 goldfish. Helen has 3 goldfish. Find the difference between the number of goldfish the girls have.</p>

# Subtraction

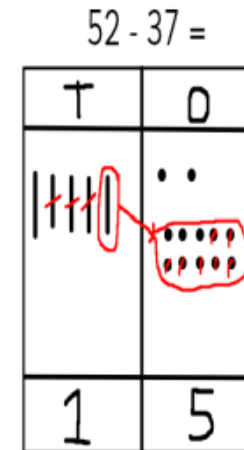
## Subtraction - Not regrouping passing 10.

Draw the greatest number into the place value chart. Then, starting with the ones, takeaway the smallest number from the greatest (cross the ones and tens as you go). You should have the same amount of crosses as the smallest number. For example 2 crosses in the ones column and 1 in the tens column to take away 12. After this, write down the remaining tens and ones to get your answer.



## Subtraction - Regrouping passing 10.


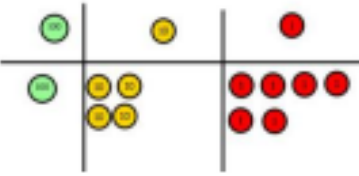
Draw the greatest number into the place value chart. Then, starting with the ones, takeaway the smallest number from the greatest (cross the ones and tens as you go). If there are too many ones to take away, regroup 1 ten to into the ones column and write it as 10 ones. Continue to take away your tens and ones (do not count the regrouped 10) and write down the remaining tens and ones to get your answer.



	Objective	Concrete	Pictorial	Abstract
Year 2	Column method without regrouping	<p><math>75 - 42 = 33</math></p> <p>Use Base 10 to make the bigger number then take the smaller number away.</p> <p>Show how you partition numbers to subtract.</p> <p>Again make the larger number first.</p>	<p>Draw the Base 10 or place value counters alongside the written calculation to help to show working.</p>	<p><math>47 - 24 = 23</math></p> $\begin{array}{r} 47 \\ - 24 \\ \hline 23 \end{array}$ <p>This will lead to a clear written column subtraction.</p>



# Subtraction

	Objective	Concrete	Pictorial	Abstract
Year 3 up	Column method with regrouping	<p>Now look at the tens, can I take away 8 tens easily? I need to exchange 1 hundred for 10 tens.</p>  <p>Calculations</p> $\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$ <p>Now I can take away 8 tens and complete my subtraction.</p>  <p>Calculations</p> $\begin{array}{r} 234 \\ - 88 \\ \hline 146 \end{array}$ <p>Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.</p>		

# Multiplication

	Objective	Concrete	Pictorial	Abstract
Year 1/2	Repeated addition	  <p>Use different objects to add equal groups.</p>	<p>There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?</p> $2 + 2 + 2 = 6$  $5 + 5 + 5 = 15$	<p>Write addition sentences to describe objects and pictures.</p> $2 + 2 + 2 = 6$
	Arrays - showing commutative multiplication	<p>Create arrays using counters/cubes to show multiplication sentences.</p> 	<p>Draw arrays in different rotations to find <b>commutative</b> multiplication sentences.</p> $4 \times 2 = 8$ $2 \times 4 = 8$  $2 \times 4 = 8$ $4 \times 2 = 8$ <p>Link arrays to area of rectangles.</p>	<p>Use an array to write multiplication sentences and reinforce repeated addition.</p> $5 + 5 + 5 = 15$ $3 + 3 + 3 + 3 + 3 = 15$ $5 \times 3 = 15$ $3 \times 5 = 15$

# Multiplication

Year 2



## Multiplication.

The first number in our multiplication tells us how many groups we need to draw. The second number tells the amount in each group. Draw the number of groups and the correct amount in each group then add them together.

In year 2 we only look at our 2, 5 and 10 timetables so this method can be used either using dot or numbers on the circles to begin counting in these intervals. For example, 10, 20, 30, 40.

Amount  
of groups.

Amount  
in each group.

$$\textcircled{2} \times \textcircled{5} =$$

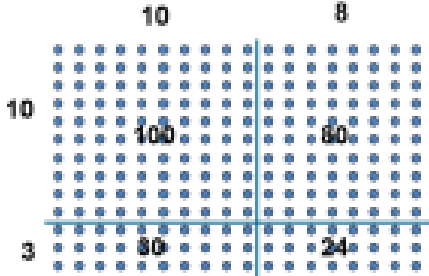
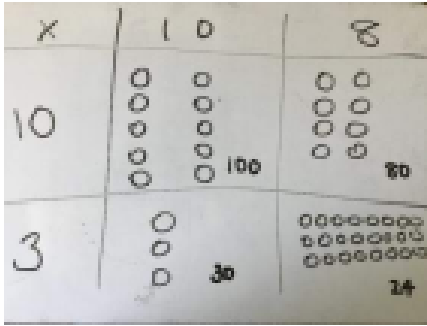
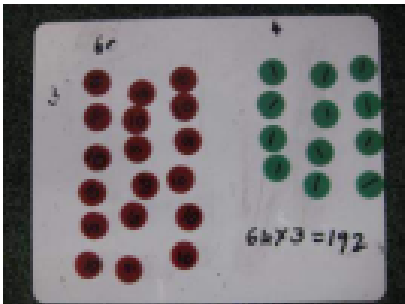
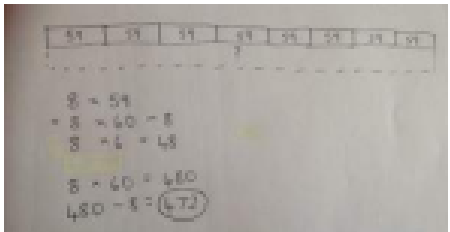
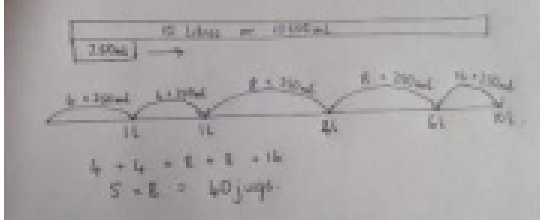
A diagram illustrating the multiplication of 2 by 5. It shows two identical circles, each containing five dots arranged in a cross pattern. A plus sign is placed between the two circles, followed by an equals sign and the number 10. The number 10 is written in red.

$$\text{○} + \text{○} = 10$$

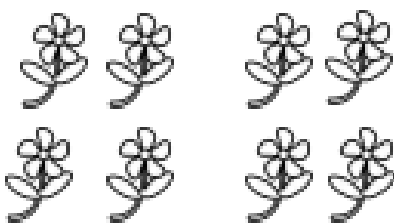
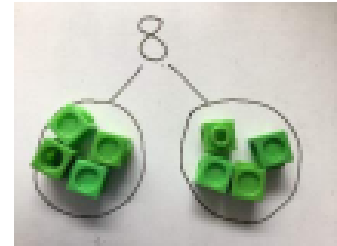
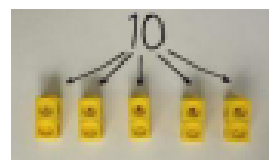
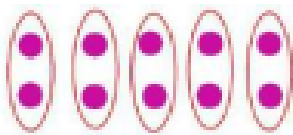
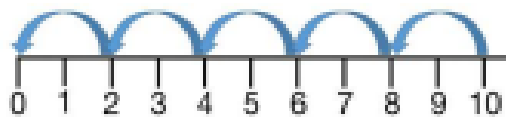
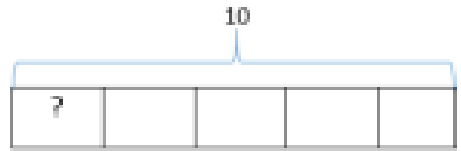
# Multiplication

	Objective	Concrete	Pictorial	Abstract																														
Year 3/4	Grid method	<p>Show the link with arrays to first introduce the grid method.</p> <p>4 rows of 10 4 rows of 3</p> <p>Move on to using Base 10 to move towards a more compact method.</p> <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>Calculations <math>4 \times 126</math></p> <p>Fill each row with 126.</p> <p>Calculations <math>4 \times 126</math></p> <p>Add up each column, starting with the ones making any exchanges needed.</p> <p><math>4 \times 126 = 504</math></p>	<p>Children can represent the work they have done with place value counters in a way that they understand.</p> <p>They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below.</p>	<p>Start with multiplying by one digit numbers and showing the clear addition alongside the grid.</p> <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><math>210 + 35 = 245</math></p> <p>Moving forward, multiply by a 2 digit number showing the different rows within the grid method.</p> <table border="1"> <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> <table border="1"> <tr> <td>X</td> <td>1000</td> <td>300</td> <td>40</td> <td>2</td> </tr> <tr> <td>10</td> <td>10000</td> <td>3000</td> <td>400</td> <td>20</td> </tr> <tr> <td>8</td> <td>8000</td> <td>2400</td> <td>320</td> <td>16</td> </tr> </table>	X	30	5	7	210	35		10	8	10	100	80	3	30	24	X	1000	300	40	2	10	10000	3000	400	20	8	8000	2400	320	16
X	30	5																																
7	210	35																																
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X	1000	300	40	2																														
10	10000	3000	400	20																														
8	8000	2400	320	16																														

# Multiplication

	Objective	Concrete	Pictorial	Abstract
	Expanded method	<p>Show the link with arrays to first introduce the expanded method.</p> 		<p>Start with long multiplication, reminding the children about lining up their numbers clearly in columns.</p> $\begin{array}{r} 18 \\ \times 13 \\ \hline 24 \quad (3 \times 8) \\ 30 \quad (3 \times 10) \\ \hline 80 \quad (10 \times 8) \\ 100 \quad (10 \times 10) \\ \hline 234 \end{array}$
Year 5/6	Compact method	<p>Children can continue to be supported by place value counters at the stage of multiplication.</p>  <p>It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.</p>	<p>Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.</p>  	<p>Start with long multiplication, reminding the children about lining up their numbers clearly in columns.</p> <p>If it helps, children can write out what they are solving next to their answer.</p> $\begin{array}{r} 74 \\ \times 63 \\ \hline 12 \\ 210 \\ \hline 420 \\ 4200 \\ \hline 4662 \end{array}$ <p>This moves to the more compact method.</p> $\begin{array}{r} 74 \\ \times 63 \\ \hline 210 \\ 420 \\ \hline 4662 \end{array}$

# Division

	Objective	Concrete	Pictorial	Abstract
Year 1/2	Sharing	<p>I have 8 cubes, can you share them equally between two people?</p>	<p>Children use pictures or shapes to share quantities.</p>  <p><math>8 \div 2 = 4</math></p>	<p>Share 8 buns between two people.</p> <p><math>8 \div 2 = 4</math></p> 
	Grouping	<p>Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.</p>  	<p>Use a number line to show jumps in groups. The number of jumps equals the number of groups.</p>  <p>Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.</p>  <p><math>10 \div 5 = ?</math></p> <p><math>5 \times ? = 10</math></p>	<p><math>10 \div 5 = 2</math></p> <p>Divide 10 into 5 groups. How many are in each group?</p>

# Division

Year 2



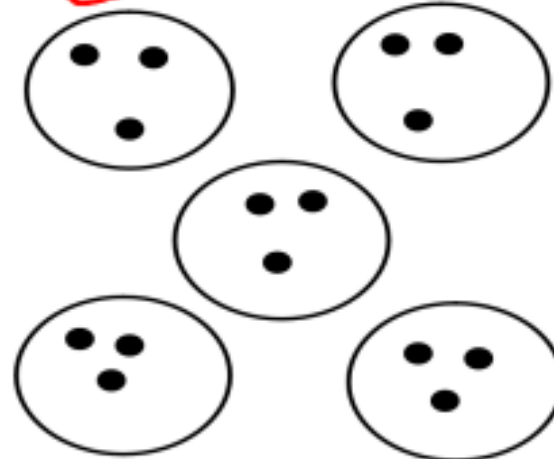
## Division

The first number is the amount which is needed to be shared equally between the amount of groups. The amount of groups needed is indicated by the second number. Draw one dot in each group (sharing equally) until you reach the amount needed to be shared. Look at the groups and the amount in one of the groups would be your answer. If you are unsure, check all of the groups to ensure they have the same amount in.

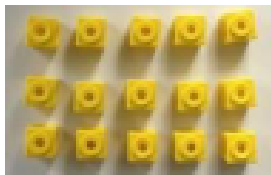
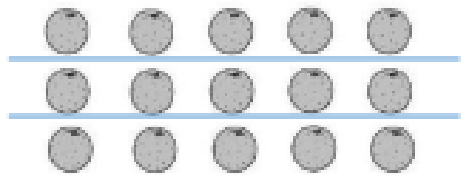
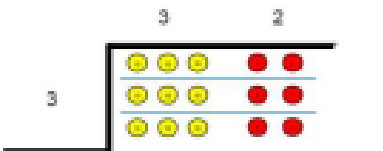

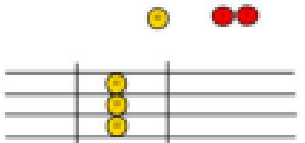
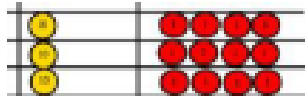
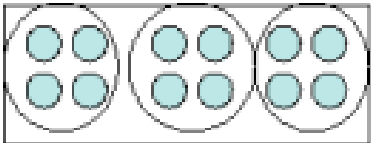
Amount shared  
equally between  
the groups.

Amount  
of groups.

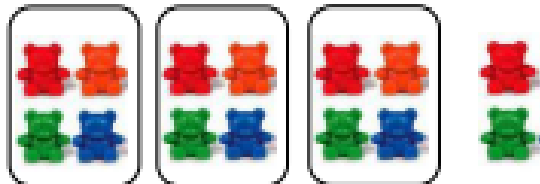


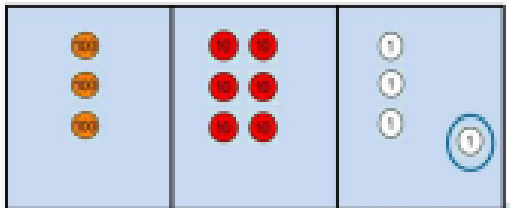
$$15 \div 5 =$$



# Division

	Objective	Concrete	Pictorial	Abstract
Year 3/4	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>  <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 four linking number sentences.</p> <p><math>5 \times 3 = 15</math>  <math>3 \times 5 = 15</math>  <math>15 \div 5 = 3</math>  <math>15 \div 3 = 5</math></p>
	Short division	<p>Use place value counters to divide using the short division method alongside.</p> <p><math>96 \div 3</math></p>  <p><math>42 \div 3</math></p> <p>Start with the biggest place value.</p>  <p>We are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.</p> <p>We exchange this ten for 10 ones and then share the ones equally among the groups.</p>  <p>We look at how many are in each group.</p> 	<p>Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.</p>  <p>Encourage them to move towards counting in multiples to divide more efficiently.</p>	<p>Begin with divisions that divide equally with no remainder.</p> $\begin{array}{r} 218 \\ 3 \overline{) 872} \end{array}$

# Division

	Objective	Concrete	Pictorial	Abstract
Year 5/6	Division with remainders	$14 \div 3 =$ Divide objects between groups and see how much is left over 	Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.  Draw dots and group them to divide an amount and clearly show a remainder. 	Complete written divisions and show the remainder using r. $\begin{array}{r} 29 \div 8 = 3 \text{ REMAINDER } 5 \\ \uparrow \quad \uparrow \quad \uparrow \quad \quad \uparrow \\ \text{dividend} \quad \text{divisor} \quad \text{quotient} \quad \quad \text{remainder} \end{array}$
	Short division with remainders	$364 \div 3 =$ $\begin{array}{r} 121 \text{ rem } 1 \\ 3 \overline{) 364} \end{array}$ 		Move onto divisions with a remainder. Once children understand remainders, begin to express as a fraction or decimal according to the context. $\begin{array}{r} 86 \text{ r } 2 \\ 5 \overline{) 432} \end{array}$ $\begin{array}{r} 186 \frac{1}{5} \\ 5 \overline{) 931} \end{array}$ $\begin{array}{r} 14.6 \\ 35 \overline{) 511.0} \end{array}$