

## NUMBER AND PLACE VALUE

<p><b>Rec</b> <b>Numeral</b> – how to write a number using digits</p>	<p><b>Year 1</b> <b>Numeral</b> – how to write a number using digits <b>Digit</b> – 24 is a 2-digit number. The 2 represents the tens, the 4 represents the ones <b>Compare</b> - equal (is the same as = ), greater, more, less, fewer, <b>Order</b> <b>Sort</b> <b>Count</b> – forwards, backwards, <b>Represent</b> <b>Tens, Ones,</b> <b>One more, One less</b></p>	<p><b>Year 2</b> <b>Consecutive</b> – following in order 2,3,4 are consecutive numbers <b>Tens, ones, hundreds</b> <b>Place value</b> <b>Numeral / words</b> <b>Partition</b>  <b>Estimate</b></p>	<p><b>Year 3</b> <b>Tens, ones, hundreds, thousands</b>  <b>Roman numerals 1 – 12</b>  <b>Whole number</b></p>	<p><b>Year 4</b> <b>Tens, ones, hundreds, thousands,</b>  <b>Tenths, hundredths</b> <b>Whole number</b> <b>Decimal number</b> <b>Decimal point</b>  <b>Round to the nearest 10</b> <b>Round to the nearest 100</b> <b>Round to the nearest 1,000</b>  <b>Negative numbers</b> – negative 3 is written -3  <b>Roman numerals to 100: I, V, X, L, C</b></p>	<p><b>Year 5</b> <b>Tens, ones, hundreds, thousands, ten thousands, hundred thousands, million</b>  <b>Tenths, hundredths, Thousandths,</b>  <b>Roman numerals to 1,000: I, V, X, L, C, D, M</b></p>	<p><b>Year 6</b> <b>Tens, ones, hundreds, thousands, ten thousands, hundred thousands, millions,</b>  <b>Tenths, hundredths, Thousandths</b>  <b>Decimal places</b></p>
---	---	--	--	---	--	---

# Addition

## Rec

**Part** – a number of parts added together makes a whole

**Whole** – a whole is made up of a number of parts

**Equal** – symbol (=) read 'equals' or 'is the same as'

## Year 1

**Numeral** – how to write a number using digits

**Digit** – 24 is a 2-digit number. The 2 represents the tens, the 4 represents the ones

**Sum** – the total of one or more additions

**Total** – the sum found by adding

**More** – to increase an amount

**Numberbond** – 2 numbers that add together to make a total, e.g. 6+4 is a numberbond to 10.

**Adding together** – (*aggregation*) – combining 2 parts together

**Adding more** – (*augmentation*) - starting with an amount and increasing it by another amount

## Year 2

**Addend** – a number to be added to another

**Commutative** – addition is commutative so

$$8 + 2 = 2 + 8$$

**Inverse** – addition and subtraction are inverse operations so  $7 + 3 = 10$  and  $10 - 3 = 7$

**Exchange** – when adding the ones in column addition if the total is greater than 10 we exchange 10 ones for a ten OR 10 tens for a hundred.

**Bridging 10** – adding 2 numbers to make ten and then add on the rest

**Column addition** – where the digits are placed in columns to add the numbers together

## Year 3

**Compensation** – a mental strategy where one number is rounded to make the calculation easier and then adjusted e.g.  $56 + 38$  is treated as  $56 + 40$  and then 2 is subtracted to compensate

**Estimate**

**Increase**

## Year 4

Consolidation of terms learnt in previous year groups

## Year 5

**Integer** – any of the positive or negative whole numbers

**Positive** – any number larger than zero

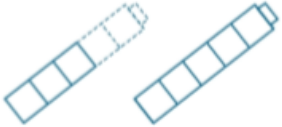
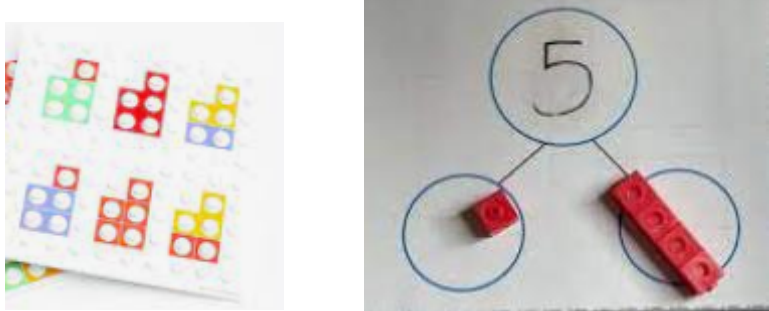
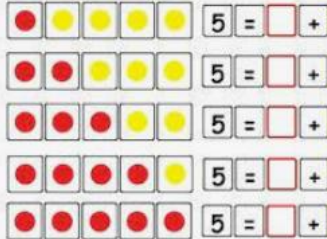
**Negative** – any number smaller than zero

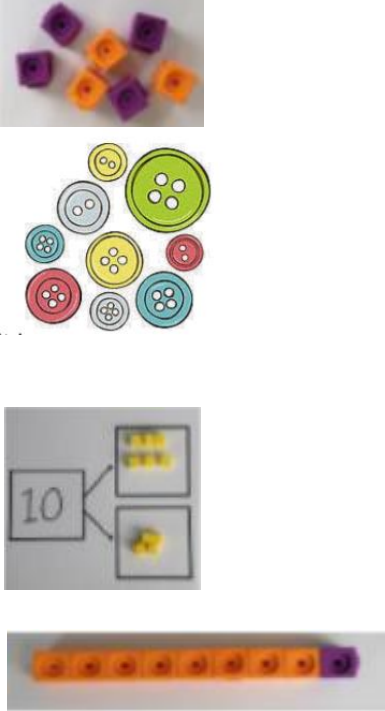
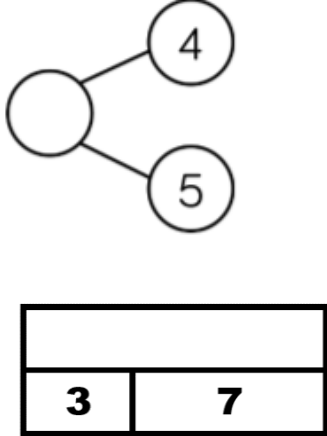
## Year 6

Consolidation of terms learnt in all previous year groups

DROITWICH MATHS CLUSTER CALCULATION POLICY

Objectives and Strategy	Concrete	Pictorial	Abstract	Notes
EYFS				
1 more, one less				
Recognise when one quantity is greater than, less than or the same as another quantity – to 10	<p>Which group of cars would you like to play with? Why?</p> 			
Combining two groups	<p>1. Combining two or more quantities</p> 			

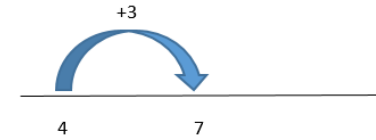
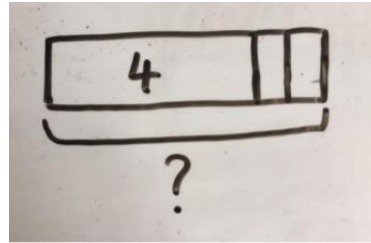
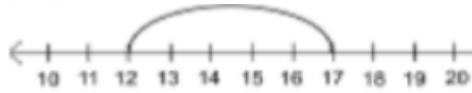
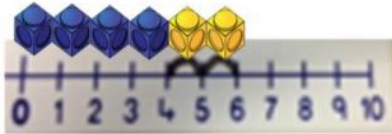
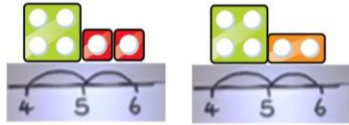
<p>Addition using augmentation</p>	<p><b>Adding using augmentation</b> (counting on method). This strategy requires fluency with counting from any number.</p> 			
<p>Recall number bonds to 5, then 10</p>	 <p>For number bonds to 10, see Year One.</p>			

Objectives and Strategy	Concrete	Pictorial	Abstract	Notes
Year One				
<p>Two parts to make a whole</p>		 <p>Children draw visual representation.</p>	<p><math>7 + 3 =</math></p> 	<p>Using concrete resources to count small collections of objects to a total.</p> <p>Using a part whole model to visually represent two collections coming together into a whole.</p> <p>This is directly linked to the bar model.</p>

Counting on



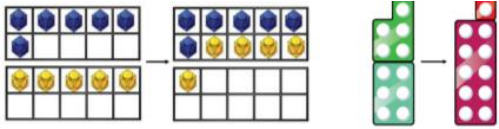
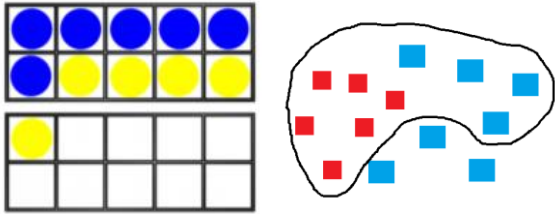


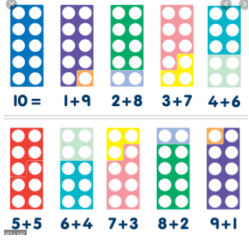

Emphasis on the commutative ability to start with either number, larger being more efficient.







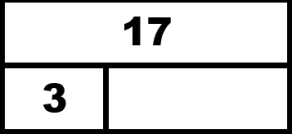
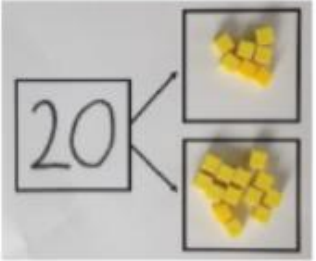
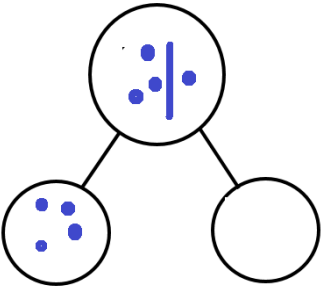
“place the large number in your head and count the smaller number on your hands”

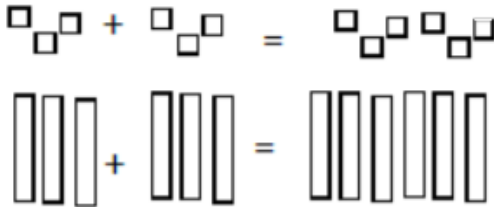



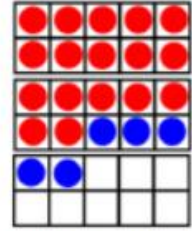
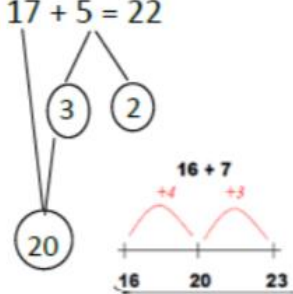

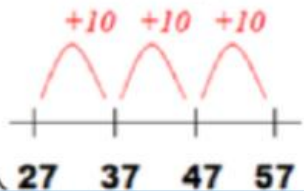
Blank number line as a strategy for jottings.


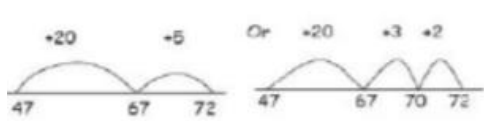
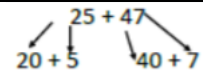

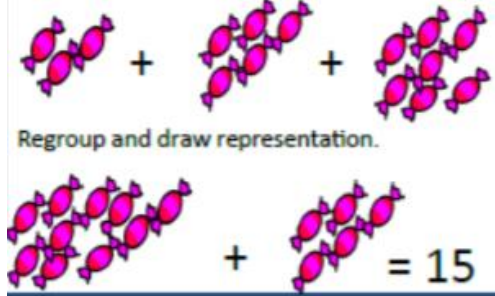
What is 2 more than 4?

<p>Regrouping to make 10.</p>			$6 + \square = 11$ $6 + 5 = 5 + \square$ $6 + 5 = \square + 4$ 	<p>Children to develop an understanding of equality and how the equals sign is a fulcrum of a seesaw.</p>
<p>Number bonds to 10 and 20</p>	 <p>Farmer Pete's 10 sheep – youtube.</p> 		<p>Through continued exposure children can recall pairs of number bonds and use these to solve number sentences.</p>	

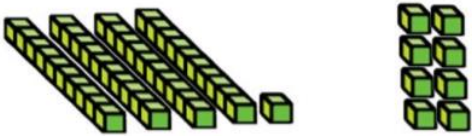
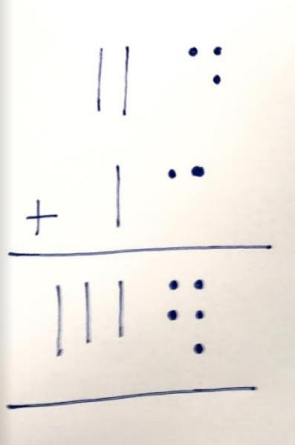
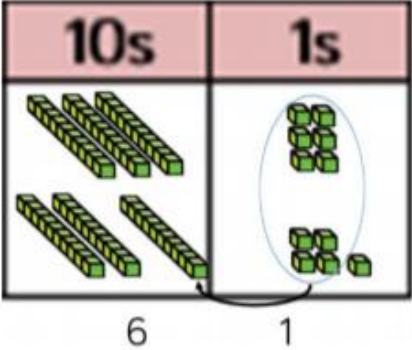
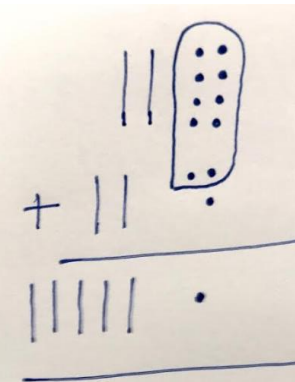
DROITWICH MATHS CLUSTER CALCULATION POLICY

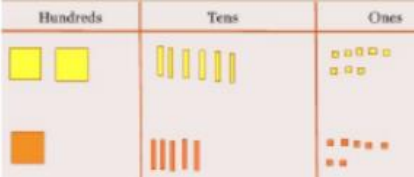
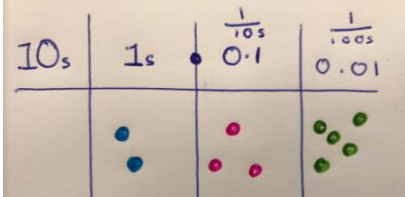
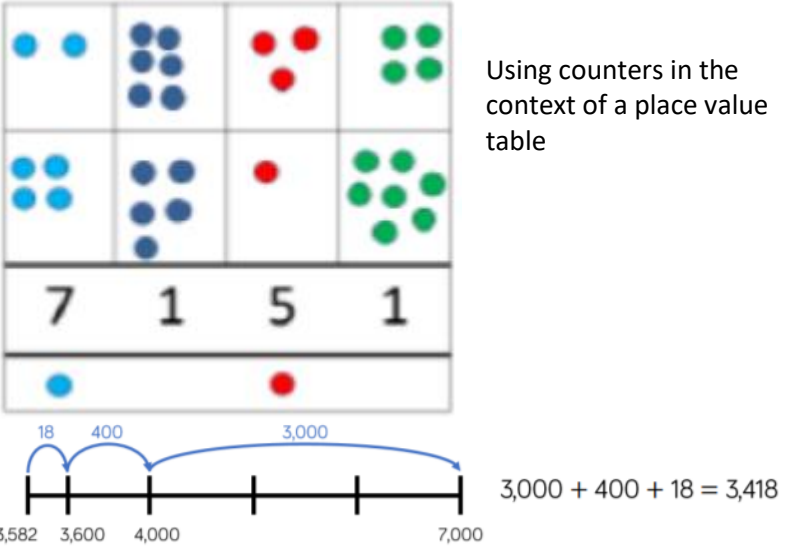
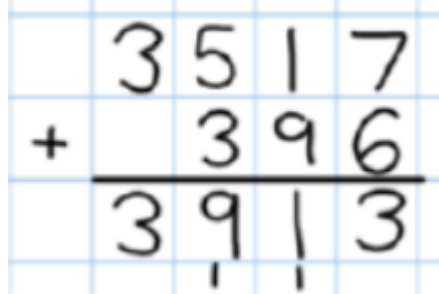
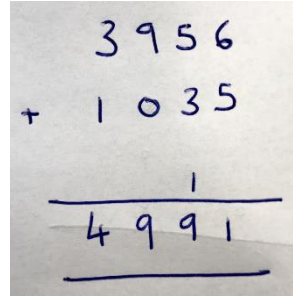
Objectives and Strategy	Concrete	Pictorial	Abstract	Notes
Year Two				
Counting and addition of 10s	 <p>10    20    30    40    50</p> <p>Counting in 10s using Dienes, beads, counting stick. Counting up, adding one more 10</p>	 <p>3 tens + 5 tens = ___ tens 30 + 50 = ___</p> <p>Children can draw their own 10s sticks to visually show</p> 	$30 + 40 =$ $50 + \square = 80$	
Solving missing number problems using the inverse. Using the inverse to check calculation.	 <p>If <math>8 + 1 = 9</math></p> <p>Using the inverse to check calculation.  <math>9 - \square = 8</math></p> <p>Children physically move the resources to demonstrate the inverse.</p>	 <p>Once calculated children display their knowledge of the inverse to create a check e.g.  <math>17 - 3 = 14</math>          Check: <math>3 + 14 = 17 \checkmark</math></p>	$3 + 14 = 17$ $14 + 3 = 17$ $17 - 3 = 14$ $17 - 14 = 3$	
Solving missing number problems using known number facts	 <p>Investigate the possibilities of making a total</p>		$\square + 4 = 14$	

<p>Using known number facts to solve related problems</p>	<p>Use Dienes to show that:</p> 	<p>Children draw to show that:</p> 	<p><math>3 + 4 = 7</math>  <math>30 + 40 = 70</math></p>					
<p>Bar Model</p>			<table border="1" data-bbox="1433 542 1668 654"> <tr> <td></td> <td></td> </tr> <tr> <td><b>3</b></td> <td><b>7</b></td> </tr> </table>			<b>3</b>	<b>7</b>	
<b>3</b>	<b>7</b>							
<p>Add two digit numbers and ones</p>	 <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>  <math>27 + 5 = 32</math></p>	<p>Use part part whole and number line to model.</p> <p><math>17 + 5 = 22</math></p> 	<p><math>17 + 5 = 22</math></p> <p>Explore related facts</p> <p><math>17 + 5 = 22</math>  <math>5 + 17 = 22</math>  <math>22 - 17 = 5</math>  <math>22 - 5 = 17</math></p> <table border="1" data-bbox="1646 933 1915 1029"> <tr> <td colspan="2">22</td> </tr> <tr> <td>17</td> <td>5</td> </tr> </table>	22		17	5	
22								
17	5							
<p>Add 2 digit number and tens</p>	 <p><math>25 + 10 = 35</math></p> <p>Explore that the ones digit does not change</p>	<p><math>27 + 30</math></p> 	<p><math>27 + 10 = 37</math>  <math>27 + 20 = 47</math>  <math>27 + \square = 57</math></p>					

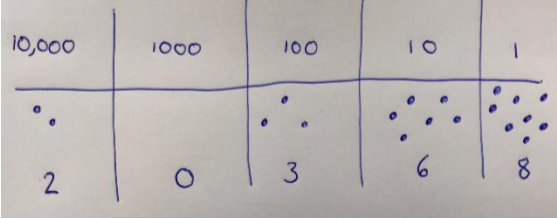
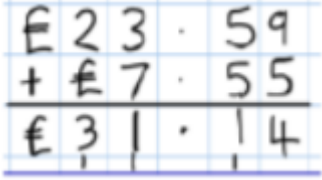
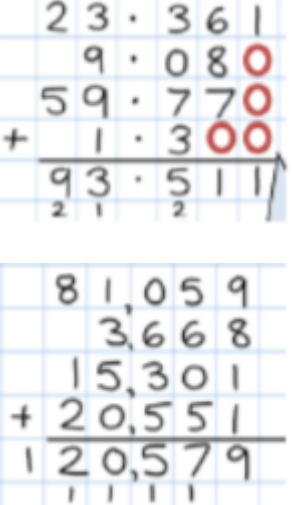
<p>Add 2 2-digit numbers</p>	 <p>Model using dienes, place value counters and numicon</p>	 <p>Use number line and bridge ten using part whole if necessary.</p>	 $25 + 47$ $20 + 40 = 60$ $5 + 7 = 12$ $60 + 12 = 72$	
<p>Add 3 1-digit numbers</p>	 <p>Combine to make 10 first if possible, or bridge 10 then add third digit</p>	 <p>Regroup and draw representation.</p> $4 + 7 + 6 = 15$	<p>“Finding secret tens”</p> $\boxed{4} + 7 + \boxed{6} = \boxed{10} + \boxed{7}$ $10 + 7 = \boxed{17}$ <p>Combine the two numbers that make/bridge ten then add on the third.</p>	

DROITWICH MATHS CLUSTER CALCULATION POLICY

Objectives and Strategy	Concrete	Pictorial	Abstract	Notes
Year Three				
<p>Column addition with no regrouping</p>	<p>Model using Dienes or numbers. Add ones first, then tens.</p> 		$\begin{array}{r} 223 \\ + 114 \\ \hline 337 \end{array}$ <p>Add the ones first, then the tens, then the hundreds.</p>	
<p>Column addition with regrouping</p>			<p>Looking for ways to make 10.</p> $\begin{array}{r} 36 + 25 = \\ \begin{array}{l} 30 + 20 = 50 \\ 5 + 5 = 10 \\ 50 + 10 + 1 = 61 \end{array} \end{array}$ <p>Formal method:</p> $\begin{array}{r} 36 \\ +25 \\ \hline 61 \\ \hline 1 \end{array}$	

Objectives and Strategy	Concrete	Pictorial	Abstract	Notes
Year Four				
<p>Adding numbers up to 4 digits</p>	<p>Children to continue to use pv counters, dienes to add and exchange ones for a ten, tens for a hundred and hundreds for thousands.</p>  	<p>Using counters in the context of a place value table</p> 	 <p>An alternative method for those who forget the carried digits when adding</p> 	<p>We advocate using a variety of vocabulary to ensure familiarity with exchange. e.g – exchange, carry, swap ect</p>





DROITWICH MATHS CLUSTER CALCULATION POLICY

Objectives and Strategy	Concrete	Pictorial	Abstract	Notes
<b>Year Five</b>				
Adding numbers over 4 digits	Using concrete representations to show numbers greater than 4 digits allows pupils to consolidate understanding of PV before applying to column addition		Column addition. 	
<b>Year Six</b>				
Adding several numbers of increasing complexity	As per year 5			Draw on all previous experiences. No excuses.

# Subtraction

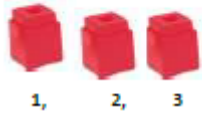
<p><u>Rec</u>  <b>Whole</b> – a whole subtract any number of parts equals a part  <b>Take away</b> – to remove a number of items from a group</p>	<p><u>Year 1</u>  <b>Subtract</b> – to carry out the process of subtraction  <b>Minus</b> – a name for the symbol ‘-’  <b>Less</b> – to decrease an amount  <b>Counting back</b>  <b>Finding the difference</b></p>	<p><u>Year 2</u>  <b>Inverse</b> – addition and subtraction are inverse operations so <math>10 - 4 = 6</math> and <math>6 + 4 = 10</math>          (it is NOT commutative)  <b>Exchange</b> – when the number to subtract is larger than the number we are subtracting from we exchange a ten into ten ones.  <b>Difference</b> – we subtract to find the difference</p>	<p><u>Year 3</u>  <b>Subtrahend</b> – a number to be subtracted from another  <b>Minuend</b> – a number from which another is to be subtracted  <small>Minuend – Subtrahend = Difference</small>  <b>Compensation</b> – a mental strategy where one number is rounded to make the calculation easier and then adjusted          e.g. <math>56 - 38</math> is treated as <math>56 - 40</math> and then 2 is added to compensate  <b>Efficient</b> subtraction (Y4) – instead of <math>4,000 - 2,124</math> do <math>3,999 - 2,123</math>  <b>Decrease</b></p>	<p><u>Year 4, 5 &amp; 6</u>          Consolidation of terms learnt in previous year groups</p>
---	---	--	--	--

DROITWICH MATHS CLUSTER CALCULATION POLICY






Objectives and Strategy:	Concrete	Pictorial	Abstract	Notes
<b>Nursery</b>				
To make comparisons between quantities	<p>Which group of cars would you like to play with? Why?</p> 			
To use the language of fewer (less) to compare a set of objects.	<p>To use the language of fewer (less) to compare a set of objects.</p>  <p>I have fewer sweets than Jenny.</p>			
To separate a group of 3 or 4 objects in different ways (total still the same)	<p>How many different ways can we put four teddies in two beds?</p> 			
To know that a group of objects changes amounts when something is taken away.	<p>To know that a group of objects changes amount when something is taken away.</p> 			

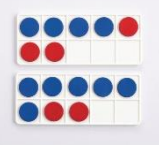
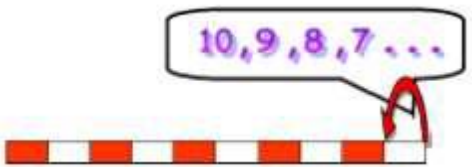

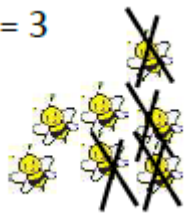
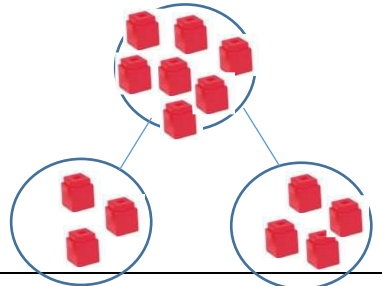
To find the total number of items after some are taken away by counting all of them.

To find the total number of items after some are taken away by counting all of them.

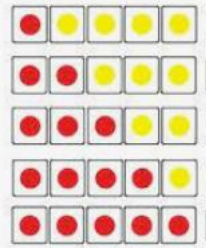
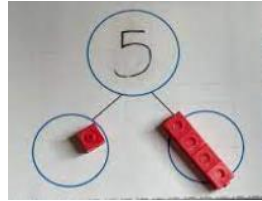


DROITWICH MATHS CLUSTER CALCULATION POLICY

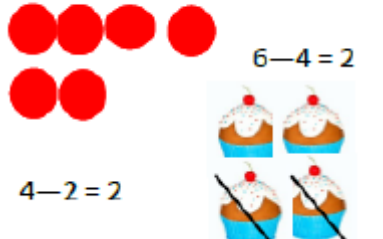
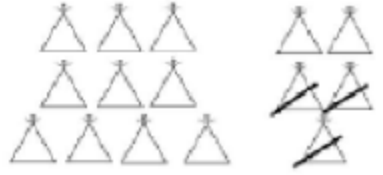

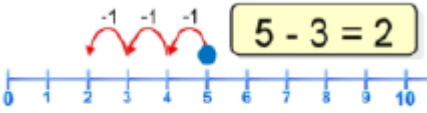
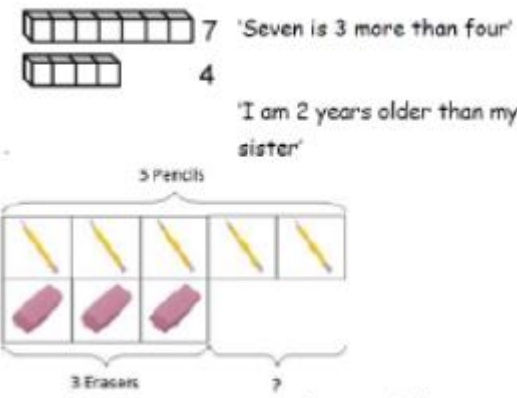
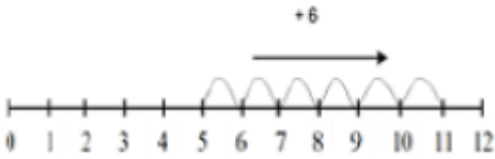
Objectives and Strategy	Concrete	Pictorial	Abstract	Notes
<b>Reception</b>				
Recognise when one quantity is greater than, less than or the same as another quantity – to 10	<p>Which group of cars would you like to play with? Why?</p> 			
Relates subtraction to taking away.	<p>3 toy cars Take away 2 Leaves 1 toy car.</p> 			
To find one less than a group of up to five, then ten objects.	 <p>1 less than 6 is 5</p>	<p>Recording using marks they can explain and apply meaning.</p>  <p>Could be explained using mark-making rather than symbols or numerals.</p>		
Using quantities and objects to subtract single-digit numbers and count on to find the answer.	 <p><math>5 - 3 = 2</math>      <math>4 - 3 = 1</math></p>			

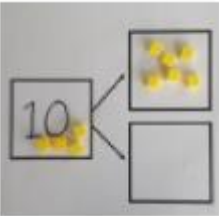
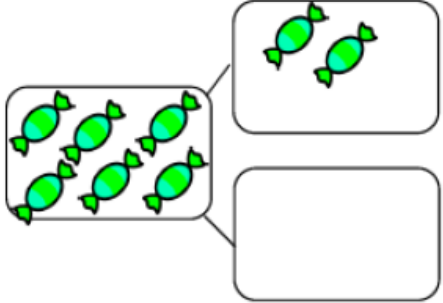
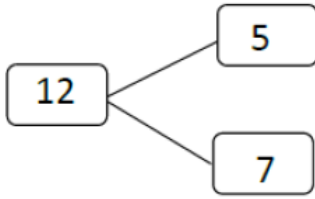
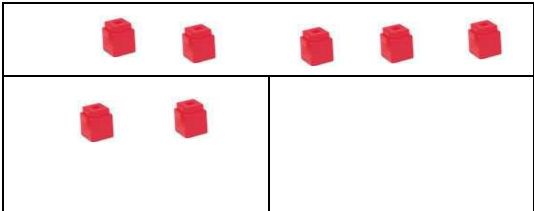
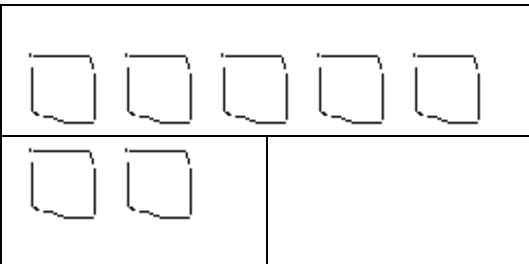
	 <p>Able to show with different concrete resources.</p>		
<p>To count backwards on a number line or counting stick.</p>			
<p>To recognise and name - and = symbols.</p>	<p>To arrange a subtraction calculation with concrete resources.</p>  <p><math>7 - 3 = 4</math></p>	<p>To solve a subtraction calculation using mark-making.</p> <p><math>7 - 4 = 3</math></p> 	<p>To read a subtraction calculation.</p> <p>To read aloud <math>7 - 4 = 3</math> knowing the correct vocabulary for the symbols - and =</p>
<p>Progression towards bar model</p>	<p>Use objects placed in a part whole model to show a subtraction calculation.</p> 	<p>Use mark-making within a part whole template, using concrete model for support.</p>	


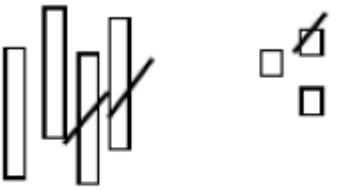
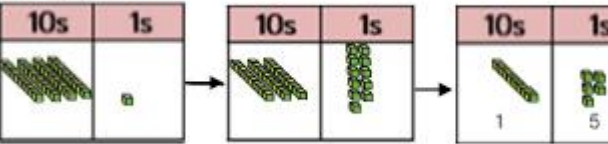
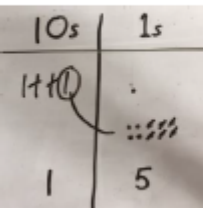
To recall  
number bonds  
to 5, including  
subtraction  
facts

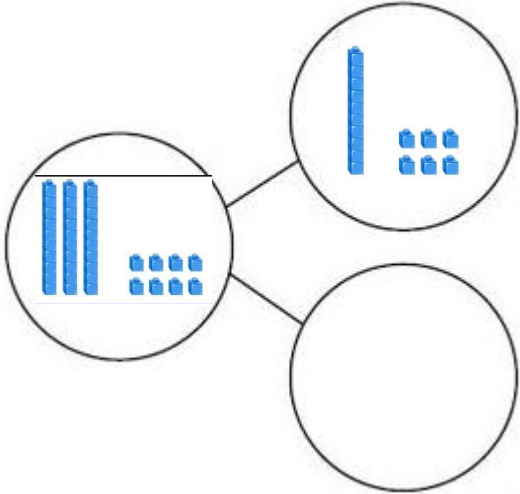
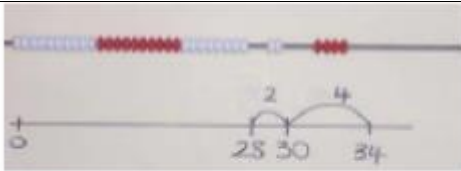
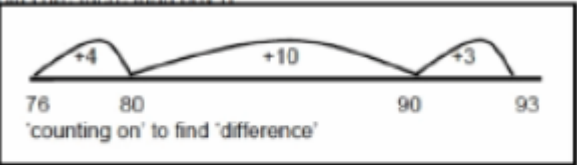


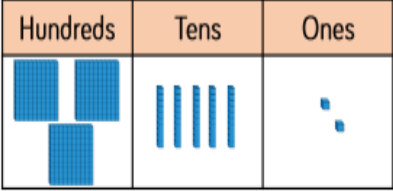
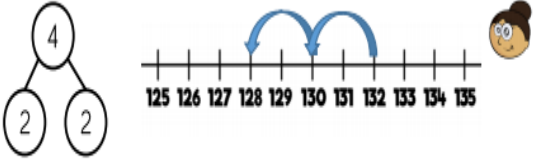
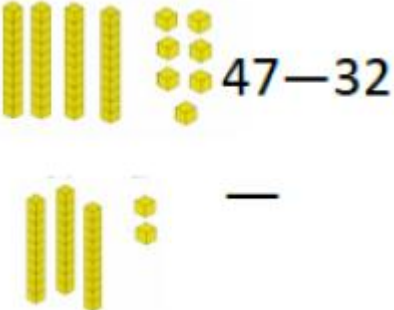
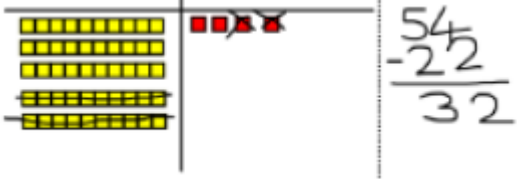

--	--

Objectives and Strategy	Concrete	Pictorial	Abstract	Notes
Year One				
Taking away ones	<p>Use physical objects, counters, cubes etc to show how objects can be taken away.</p>  <p><math>6 - 4 = 2</math></p> <p><math>4 - 2 = 2</math></p>	 <p><math>15 - 3 = 12</math></p> <p>Cross out drawn objects to show what has been taken away.</p>	<p><math>7 - 4 = 3</math></p> <p><math>16 - 9 = 7</math></p>	
Counting back	 <p>Move objects away from the group, counting backwards.</p>	 <p>Count back in ones using a number line.</p>	<p>Think of the number 9. You count backwards 4. What number will you be at?</p> <p>Put 13 in your head, then count back 5. Where are you at now?</p>	
Find the difference	<p>Compare objects and amounts</p>  <p>Lay objects to represent bar model.</p>	<p>Count on using a number line to find the difference.</p> 	<p>Hannah has 12 sweets and her sister has 7. How many more does Hannah have compared to her sister?</p>	

<p>Represent and use number bonds and related subtraction facts within 20</p> <p>Part Whole Model</p>	 <p>Link to addition. Use Part-Whole model to show the inverse.</p> <p>'If 10 is the whole and 6 is one of the parts, what will the other part be?'</p> $10 - 6 = 4$	 <p>Use pictorial representations to show the part.</p>	<p>Move to using numbers within the part whole model.</p> 		
<p>Bar Model</p>	 <p>Using concrete resources, place them on a bar model template, and describe how many more need to be added to match the top bar.</p>	<p>Use simplistic representations of concrete objects, drawing them in the correct place on a bar model template.</p> 	<table border="1" data-bbox="1556 758 2016 845"> <tr> <td style="text-align: center;">8</td> <td style="text-align: center;">2</td> </tr> </table> $10 = 8 + 2$ $10 = 2 + 8$ $10 - 2 = 8$ $10 - 8 = 2$	8	2
8	2				

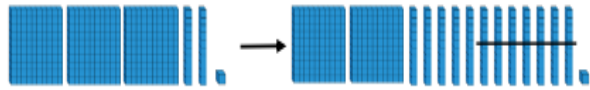
Objectives and Strategy	Concrete	Pictorial	Abstract	Notes
Year Two				
Partitioning to subtract without regrouping	 <p>Use Base 10 to show how to partition the number when subtracting without regrouping.</p>	 $43 - 21 = 22$ <p>Children to draw representations of base 10 to support understanding.</p>	$43 - 21 = 22$	
Partitioning to subtract with regrouping	<p>Column method using base 10 and having to exchange. 41 - 26</p> 	<p>Represent the base 10 pictorially, remembering to show the exchange.</p> 	<p>The logical abstract progression would be column subtraction, but this will come in for the Year 3 subtraction. For now, we would expect Year 2 to draw representations of Base 10, or use a number line, and this is enough.</p>	

<p>Conceptual Variation</p>	 <p>Using a Part-Whole model with Base 10.</p>	<p>Progressing to representing subtraction problems with drawn bar models.</p> <table border="1" data-bbox="927 276 1518 437"> <tr> <td style="width: 100px; height: 40px; text-align: center; vertical-align: middle;">38</td> <td style="width: 100px; height: 40px;"></td> </tr> <tr> <td style="width: 50px; height: 40px; text-align: center; vertical-align: middle;">16</td> <td style="width: 50px; height: 40px;"></td> </tr> </table>	38		16		<p>Missing number problems using numbers less than 100.</p> <p>Tests understanding of inverse.</p> $38 - \underline{\quad} = 16$
38							
16							
<p>Using tens as a bridging point</p>	 <p style="text-align: center;"><math>34 - 28</math></p> <p>Use a bead bar or bead strings to model counting to next ten and the rest.</p>	 <p style="text-align: center;">'counting on' to find 'difference'</p> <p>Use a number line to count on to next ten and then the rest.</p>	$93 - 76 = 17$				

Objectives and Strategy	Concrete	Pictorial	Abstract	Notes				
Year Three								
Mental subtraction, 3 digit and ones, tens, hundreds	 <p>Use place value counters to complete the number sentences.</p> <p><math>352 + 4 \text{ tens} = \underline{\quad}</math>      <math>352 - 2 \text{ tens} = \underline{\quad}</math></p> <p>Use concrete resources to support working for mental questions.</p>	<p>Dora uses the part-whole model and number line to solve <math>132 - 4</math></p>  <p>Use this method to calculate:</p> <p><math>132 - 8</math>      <math>123 - 8</math>      <math>123 - 5</math></p>	<p>Complete:</p> <table border="1" data-bbox="1621 368 1883 592"> <tr><td><math>793 - 60 =</math></td></tr> <tr><td><math>793 - 70 =</math></td></tr> <tr><td><math>793 - 80 =</math></td></tr> <tr><td><math>793 - 90 =</math></td></tr> </table> <p>If pupils know the mental answer to the first question, they can use the answer to formulate the following answers, recognising the pattern and answering it mentally.</p>	$793 - 60 =$	$793 - 70 =$	$793 - 80 =$	$793 - 90 =$	
$793 - 60 =$								
$793 - 70 =$								
$793 - 80 =$								
$793 - 90 =$								
Formal Column with 3 digits, no regrouping	 <p>Use Base 10, Numicon or place value counters to model and show this.</p>	 <p>Draw representations to support understanding</p>						

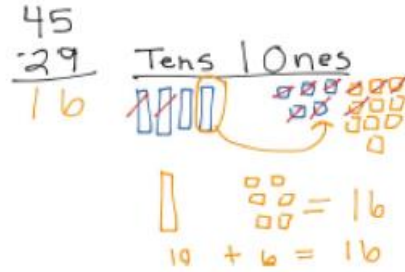
Formal  
Column with  
3 digits, with  
regrouping

Rosie uses Base 10 to subtract 70 from 321



Use Base 10 to represent the answer.

This kind of question could also be calculated and proven using place value counters.

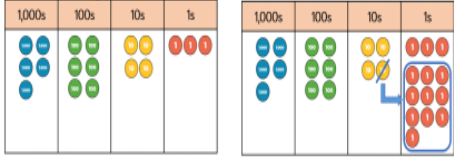
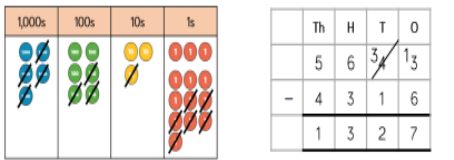
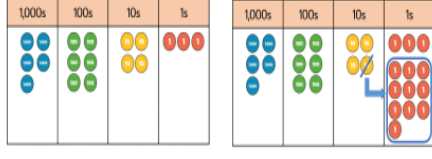




Children may draw base ten or PV counters and cross off.



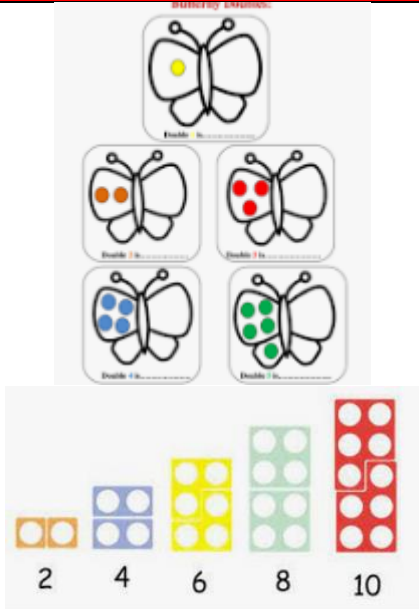
Then move to formal method.

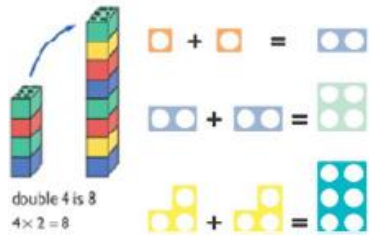

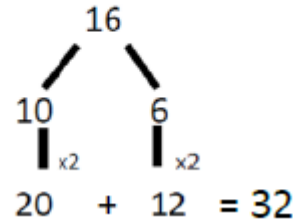
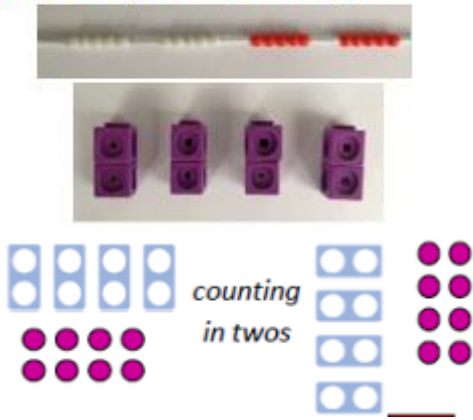
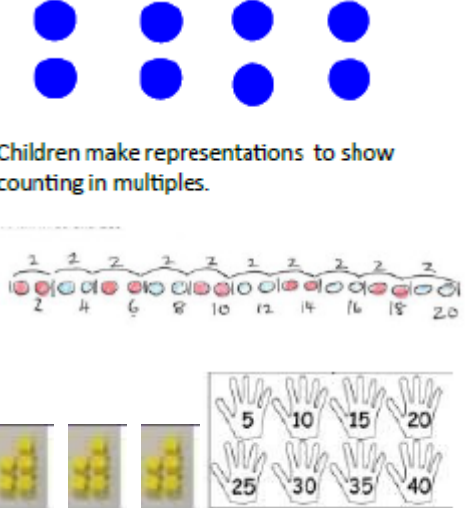
DROITWICH MATHS CLUSTER CALCULATION POLICY

Objectives:	Concrete	Pictorial	Abstract	Notes
<b>Year Four</b>				
<b>4 digit columnar</b>	<p>Dexter is using place value counters to calculate <math>5,643 - 4,316</math></p>   <p>Students can use Base 10 and Place Value counters to represent and describe column subtraction where exchanging is necessary.</p>	<p>Dexter is using place value counters to calculate <math>5,643 - 4,316</math></p>   <p>Rather than physically moving counters, children draw and cross out place value counters to represent the exchange. Same for Base 10.</p>	 <p>Abstract column subtraction, laid out as above.</p>	
<i>Objectives and Strategy</i>	<i>Concrete</i>	<i>Pictorial</i>	<i>Abstract</i>	<i>Notes</i>
<b>Year Five</b>				
<b>Year Six</b>				
<b>4+ digit columnar</b>	Concrete resources would remain the same as Year 4, see above. Year 5 and 6 questions would involve numbers up to 10 million.	Pictorial representations would remain the same as Year 4, see above. Year 5 and 6 questions would involve numbers up to 10 million.	Abstract method would remain the same as Year 4, see above. Year 5 and 6 questions would involve numbers up to 10 million.	

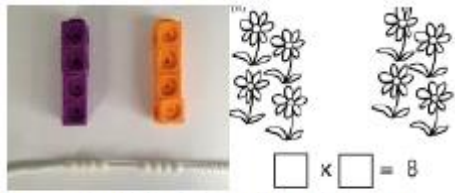
# Multiplication

<u>Rec</u>	<u>Year 1</u> <b>Groups of, sets of, lots of</b> <b>Equal groups</b> <b>Counting patterns (2s, 5s, 10s)</b> <b>Doubles</b>	<u>Year 2</u> <b>Multiply</b> – to carry out the process of multiplication <b>Multiple</b> – a number in a times table e.g. the multiples of 2 are 2,4,6 etc. <b>Groups of, lots of, sets of, times, multiplied by</b> – different ways to say the symbol “x” <b>Array</b> – an ordered collection of objects in rows and columns <b>Commutative</b> – knowing 3 x 5 will get the same answer as 5 x 3 <b>Even</b> – numbers in the 2 times table <b>Odd</b> – numbers not in the 2 times tables <b>Pairs</b>	<u>Year 3</u> <b>Factor</b> – factor x factor = product  <b>Product</b> – the result of multiplying 2 numbers  <b>Multiply</b>  <b>Scaling</b> – to enlarge a number, quantity or measurement by an amount	<u>Year 4</u> <b>Factor</b> – factor x factor = product e.g. 1,2,3,4,6,12 are factors of 12 <b>Factor pairs</b> - A <u>factor pair</u> is 2 factors multiplied together to make a given product <b>Short multiplication</b> – a method used to multiply 2 or more digits by a 1 digit number, using columns	<u>Year 5 &amp; 6</u> <b>Prime number</b> – A whole number greater than 1 that only has two factors, itself and 1. <b>Composite</b> – a non prime number. <b>Common factor</b> – a number which is a factor of 2 or more other numbers e.g. 3 is a common factor of 9 and 30, 7 is a common factor of 14 and 21. <b>Prime factor</b> – the factors of a number that are prime e.g. 2 and 3 are the prime factors of 12 <b>Common multiple</b> – the smallest positive number that is a <b>multiple</b> of two or more numbers e.g. 24 is a common multiple of 4,6,8 etc. <b>Square numbers</b> <b>Cube numbers</b>

<i>Objectives and Strategy</i>	<i>Concrete</i>	<i>Pictorial</i>	<i>Abstract</i>	<i>Notes</i>
<b>EYFS</b>				
Doubling – to 5	 <p>The concrete resources include a 'Butterfly Examples' section with five butterflies. The first butterfly has 1 yellow dot. The second has 2 orange dots. The third has 3 red dots. The fourth has 4 blue dots. The fifth has 5 green dots. Below this is a row of five dot markers: 2 orange, 4 blue, 6 yellow, 8 green, and 10 red. Each marker is a vertical strip with the number of dots indicated below it.</p>			

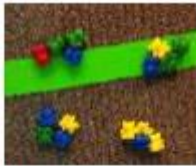
Objectives and Strategy				
Year One				
Doubling	<p>Use practical activities using manipulatives including cubes and Numicon to demonstrate doubling</p> 	<p>Draw pictures to show how to double numbers</p> <p>Double 4 is 8</p> 	<p>Partition a number and then double each part before recombining it back together.</p> 	
Counting in Multiples	<p>Count the groups as children are skip counting, children may use their fingers as they are skip counting.</p> 	<p>Children make representations to show counting in multiples.</p> 	<p>Count in multiples of a number aloud.</p> <p>Write sequences with multiples of numbers.</p> <p>2, 4, 6, 8, 10</p> <p>5, 10, 15, 20, 25, 30</p>	
Making Equal groups and				

counting the total

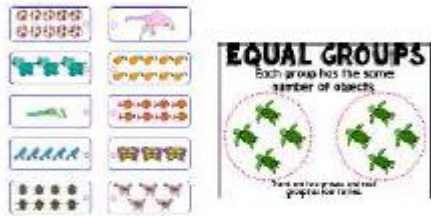


Use manipulatives to create equal groups.

Children can lay out equal groups.



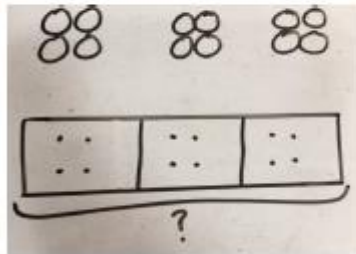
Can match equal groups.




Recognise when they are given equal amounts.



Children to represent the practical resources in a picture and use a bar model.

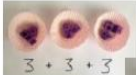

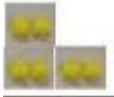
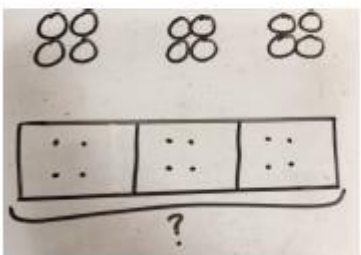
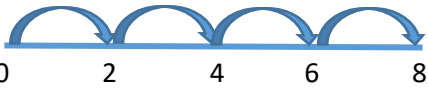

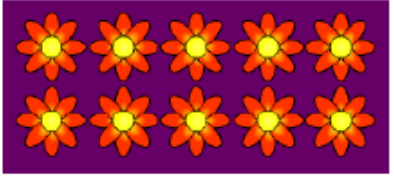
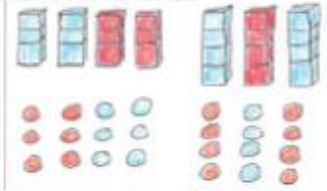


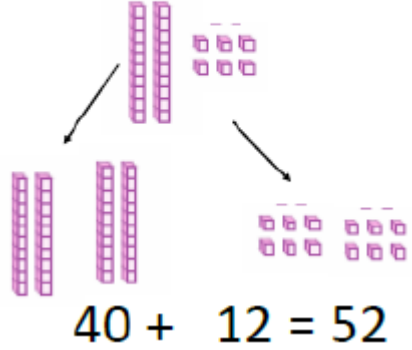
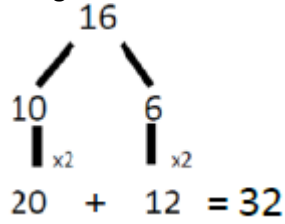
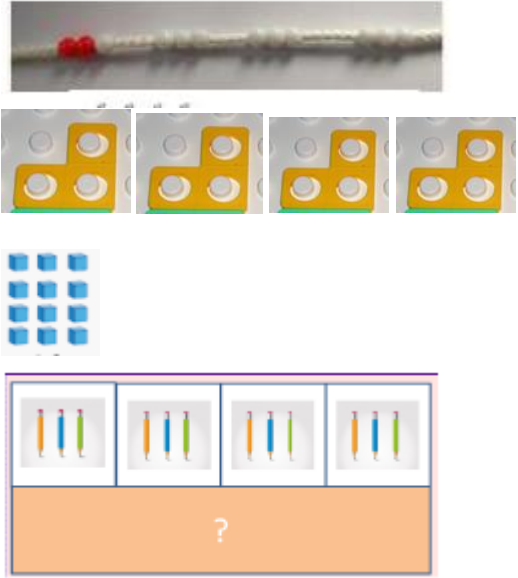
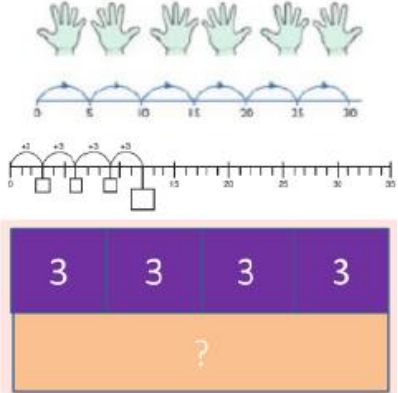
Draw  to show  $2 \times 3 = 6$






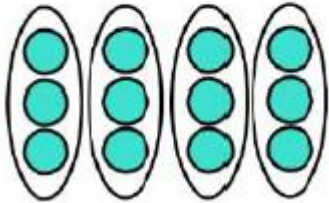
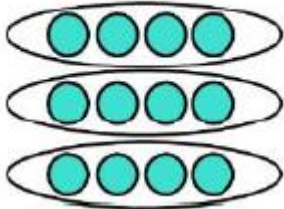

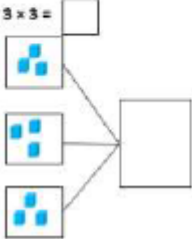
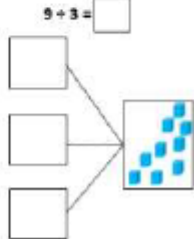

Draw and make representations

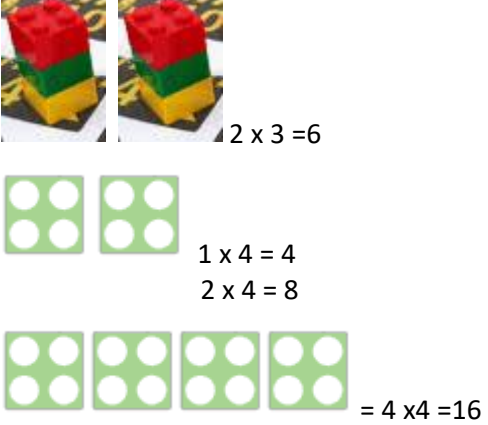
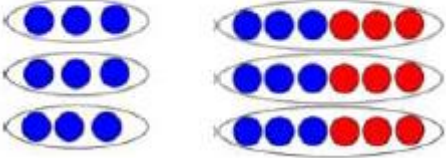

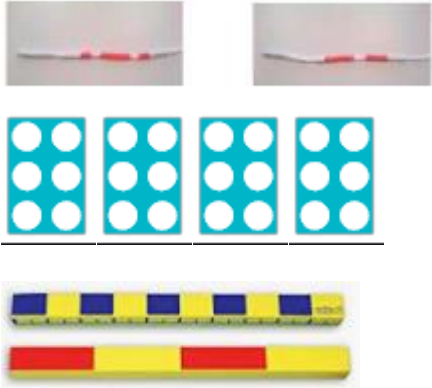
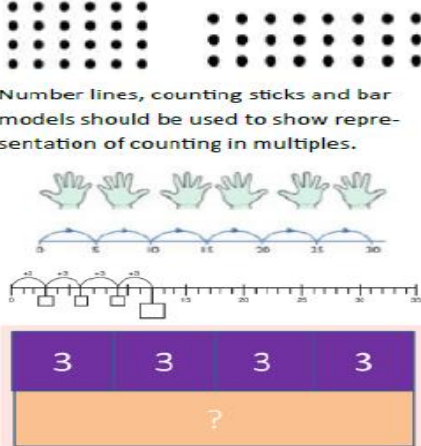
$$3 \times 4 = 12$$








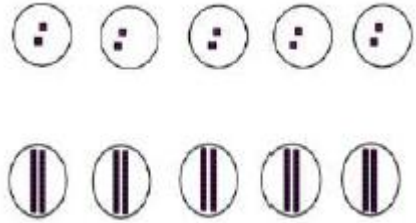
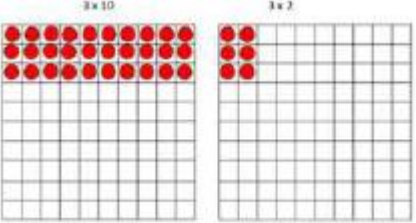








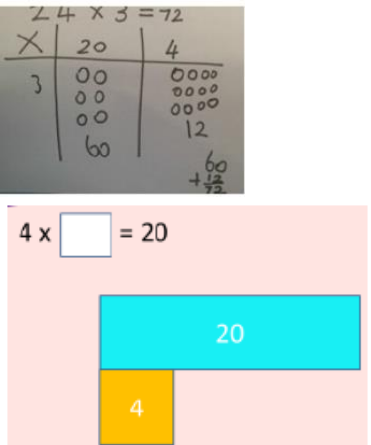




$$4 + 4 + 4 = 12$$

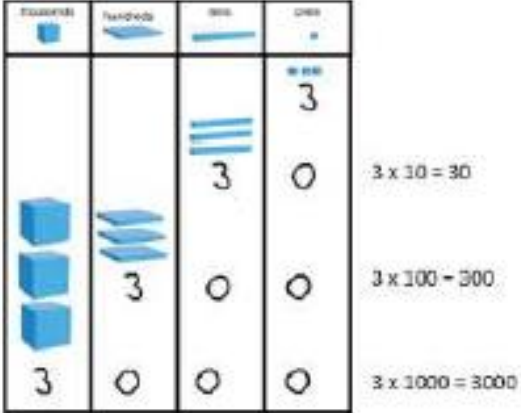
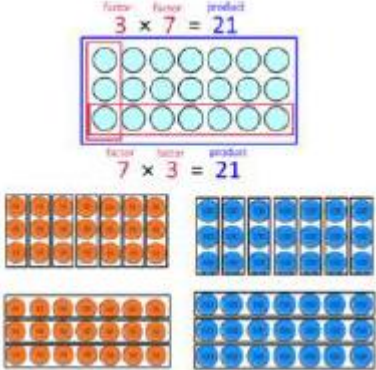
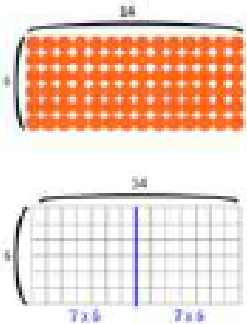
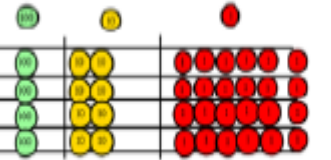
<p>Repeated Addition</p>	 <p><math>3 + 3 + 3</math></p>  <p>Use different objects to add equal groups</p>  <p>Use Base 10</p>	<p>Children to represent the practical resources in a picture and use a bar model.</p> 	 <p><math>2+2+2+2 = 8</math>  <math>4 \times 2 = 8</math></p>	
<p>Understanding arrays</p>	<p>Use arrays to illustrate commutativity counters and other objects can also be used.  <math>2 \times 5 = 5 \times 2</math></p>  <p>2 lots of 5      5 lots of 2</p> <p>Use objects laid out in arrays to find the answers to 2 lots 5, 3 lots of 2 etc.</p> 	<p>Draw representations of arrays to show understanding</p> 	<p>Children to be able to use an array to write a range of calculations e.g.</p> <p><math>10 = 2 \times 5</math>  <math>5 \times 2 = 10</math>  <math>2 + 2 + 2 + 2 + 2 = 10</math>  <math>10 = 5 + 5</math></p>	

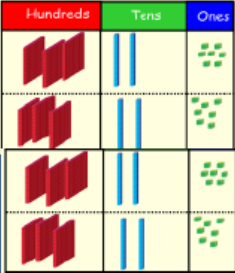
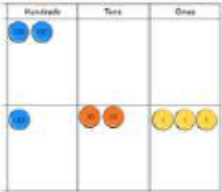
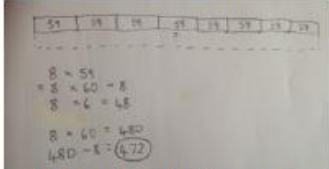


Objectives & Strategy	Concrete	Pictorial	Abstract	Notes
Year Two				
Doubling	<p><b>Model doubling using dienes and PV counters.</b></p>  <p><math>40 + 12 = 52</math></p>	<p>Draw pictures and representations to show how to double numbers.</p>	<p>Partition a number and then double each part back before recombining it back together.</p>  <p><math>20 + 12 = 32</math></p>	
<p>Counting in multiples of 2,3,4,5,10 from 0</p> <p>Multiplication is commutative</p>		<p>Number lines, counting sticks and bar models should be used to show representation of counting in multiples.</p> 	<p>Count aloud in multiples of a number Write sequences with multiples of numbers</p> <p>0,2,4,6,8, 0,3,6,9,12 0,4,8,12,16</p> <p><math>4 \times 3 =</math> <input type="text"/></p>	

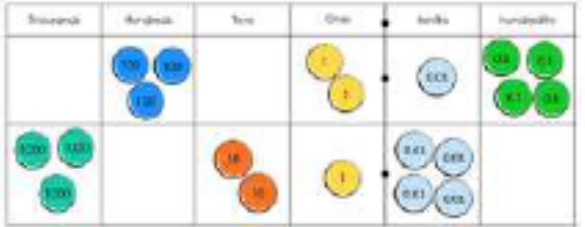

	<p>Create arrays using counters and cubes and Numicon.</p>    <p>Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer.</p>  	<p>Use representations of arrays to show different calculations and explore commutativity.</p>  	<p>Use an array to write multiplication sentences and reinforce repeated addition.</p>  <p> <math>5 + 5 + 5 = 15</math>  <math>3 + 3 + 3 + 3 + 3 = 15</math>  <math>5 \times 3 = 15</math>  <math>3 \times 5 = 15</math> </p>	
<p>Using the inverse</p>	<p>Use of part-part-whole model to establish the inverse relationship between multiplication and division</p> <p>This link should be made explicit from early on, using the language of the part-part-whole model, so that pupils develop an early understanding of the relationship between multiplication and division. Bar models (with Cuisenaire rods) should be used to identify the whole, the value of the parts and the number of parts.</p> <p>It is important to highlight that with multiplication, the parts are of equal value as this is different to how this model is used for addition and subtraction.</p> <p>There are three equal parts. Each part has a value of three. What is the whole?</p>  	 <p> <input type="checkbox"/> <math>\times</math> <input type="checkbox"/> = <input type="checkbox"/>  <input type="checkbox"/> <math>\times</math> <input type="checkbox"/> = <input type="checkbox"/>  <input type="checkbox"/> <math>\div</math> <input type="checkbox"/> = <input type="checkbox"/>  <input type="checkbox"/> <math>\div</math> <input type="checkbox"/> = <input type="checkbox"/> </p>	<p> <math>2 \times 4 = 8</math>  <math>4 \times 2 = 8</math>  <math>8 \div 4 = 2</math>  <math>8 \div 2 = 4</math> </p>	

Objectives & Strategy	Concrete	Pictorial	Abstract	Notes
Year Three				
Doubling to derive new multiplication facts	 <p>2 x 3 = 6</p> <p>1 x 4 = 4 2 x 4 = 8</p> <p>4 x 4 = 16</p>	<p>This builds on the doubling strategy from Year 2.</p> <p>3 x 3 = 9      3 x 6 = double 9 = 18</p> 	<p>3 x 4 = 12      6 x 4 = 24</p>  <p>Counting in steps</p>	
Counting in multiples of 2,3,4,5,6,8,10		 <p>Number lines, counting sticks and bar models should be used to show representation of counting in multiples.</p>	<p>3,6,9,12,15,18</p> <p>1x3 = 3 2x3 = 6 3x3 = 12 4x3 = 15</p>	

Objectives & Strategy	Concrete	Pictorial	Abstract	Notes																					
<p>10 x 100x times greater</p>	<p> <math>5 \times 1 = 5</math>   <math>5 \times 10 = 50</math>   <math>3 \times 1 = 3</math>   <math>3 \times 100 = 300</math>   <math>5 = 1 \times 5</math>   <math>50 = 10 \times 5</math>   <math>500 = 100 \times 5</math>  </p>		<p>10 x bigger than 23 is .....</p> <p>10 times greater than 6 is .....</p> <p><math>6 \times 60 = 360</math></p>	<p>The language of 10 times greater must be well modelled and understood to prevent the numerical misconception of adding a zero.</p>																					
<p>Partitioning Grid Method</p>	 <table border="1" data-bbox="331 1045 604 1173"> <tr><td>×</td><td>10</td><td>2</td></tr> <tr><td>3</td><td></td><td></td></tr> </table> <table border="1" data-bbox="331 1204 504 1324"> <tr><td>×</td><td>10</td><td>4</td></tr> <tr><td>3</td><td></td><td></td></tr> <tr><td></td><td>30</td><td>12</td></tr> </table>	×	10	2	3			×	10	4	3				30	12	 <p><math>4 \times \square = 20</math></p>	<table border="1" data-bbox="1473 805 1892 1005"> <tr><td>×</td><td>10</td><td>2</td></tr> <tr><td>3</td><td>30</td><td>6</td></tr> </table>	×	10	2	3	30	6	
×	10	2																							
3																									
×	10	4																							
3																									
	30	12																							
×	10	2																							
3	30	6																							

Objectives & Strategy	Concrete	Pictorial	Abstract	Notes								
Year Four												
<p>Multiplying by 10 and 100</p>	 <p> <math>3 \times 10 = 30</math>  <math>3 \times 100 = 300</math>  <math>3 \times 1000 = 3000</math> </p>	 <p> <math>3 \times 7 = 21</math>  <math>7 \times 3 = 21</math> </p>	<p> <math>30 \times 7 = 210</math>      <math>300 \times 7 = 2100</math>  <math>70 \times 3 = 210</math>      <math>700 \times 3 = 2100</math>  <math>7 \times 30 = 210</math>      <math>7 \times 300 = 2100</math>  <math>3 \times 70 = 210</math>      <math>3 \times 700 = 2100</math> </p>	<p>When you multiply by ten, each part is ten times greater. The ones become tens, the tens become hundreds, etc. When multiplying whole numbers, a zero holds a place so that each digit has a value that is ten times greater. Repeated multiplication by ten will build an understanding of multiplying by 100 and 1000</p>								
<p>Partitioning and Distributive law.</p>		 <p> <math>4 \times 126</math>                  Fill each row with 126             </p>	<table border="1" data-bbox="1469 1166 1944 1241"> <tr> <td>x</td> <td>100</td> <td>20</td> <td>6</td> </tr> <tr> <td>4</td> <td></td> <td></td> <td></td> </tr> </table>	x	100	20	6	4				<p>As well as partitioning in tens and ones pupils begin to explore compensating strategies and factorisation to find the most efficient solution to a calculation.</p>
x	100	20	6									
4												

<p>Column Multiplication</p>	 <p>It is important at this stage that they always multiply the ones first.</p> 	<table border="1" data-bbox="1025 181 1294 245"> <tr> <td>x</td> <td>300</td> <td>20</td> <td>7</td> <td></td> </tr> <tr> <td>4</td> <td>1200</td> <td>80</td> <td>28</td> <td></td> </tr> </table> <p>The grid method may be used to show how this relates to a formal written method.</p>  <p>Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.</p>	x	300	20	7		4	1200	80	28		$\begin{array}{r} 327 \\ \times 4 \\ \hline 28 \\ 80 \\ \hline 1200 \\ 1308 \end{array}$  <table border="1" data-bbox="1464 491 1644 638"> <tr> <td></td> <td>3</td> <td>2</td> <td>7</td> </tr> <tr> <td>x</td> <td></td> <td></td> <td>4</td> </tr> <tr> <td></td> <td>1</td> <td>3</td> <td>0</td> </tr> <tr> <td></td> <td></td> <td>1</td> <td>2</td> </tr> <tr> <td></td> <td></td> <td></td> <td>8</td> </tr> </table> <p>This may lead to a compact method.</p> $\begin{array}{r} 241 \\ \times 3 \\ \hline 723 \\ \hline 1 \end{array}$		3	2	7	x			4		1	3	0			1	2				8	
x	300	20	7																															
4	1200	80	28																															
	3	2	7																															
x			4																															
	1	3	0																															
		1	2																															
			8																															
<p>Multiplying 3 digit numbers by 1. Associative Law</p>		<p>Four pots each containing two flowers which each have seven petals. How many petals in total?</p> 	<p><math>(4 \times 2) \times 7</math> or <math>4 \times (2 \times 7)</math></p>																															

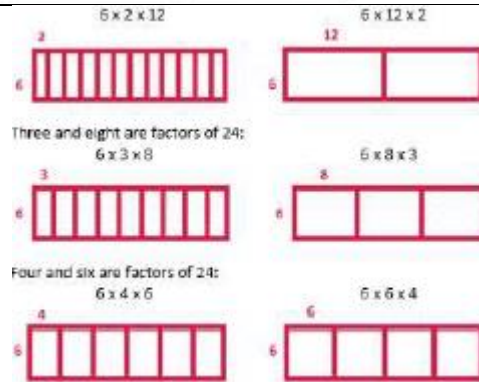
Objectives & Strategy	Concrete	Pictorial	Abstract	Notes																																																											
Year Five																																																															
Year Six																																																															
Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.	 <p>To visualise and notice what happens to the digits.</p>	<table border="1" data-bbox="965 384 1435 533"> <tr> <td>x</td> <td>100.</td> <td>10.</td> <td>1.</td> <td>0.1</td> <td>0.01</td> </tr> <tr> <td></td> <td></td> <td></td> <td>1.</td> <td>6</td> <td>6</td> </tr> <tr> <td></td> <td></td> <td>1</td> <td>6.</td> <td>6</td> <td></td> </tr> <tr> <td></td> <td>1</td> <td>6</td> <td>6</td> <td></td> <td></td> </tr> </table>	x	100.	10.	1.	0.1	0.01				1.	6	6			1	6.	6			1	6	6			<p>16.6 x 10 = Make 16.6 10 x bigger</p>	<p>Avoid saying you add a zero when multiplying by 10 and instead use the language of place holder.</p>																																			
x	100.	10.	1.	0.1	0.01																																																										
			1.	6	6																																																										
		1	6.	6																																																											
	1	6	6																																																												
Column Multiplication for 3 and 4 x 1 digit.	<table border="1" data-bbox="338 655 651 1023"> <thead> <tr> <th>Hundreds</th> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>It is important at this stage that they always multiply the ones first.</p> <p>Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. <math>321 \times 2 = 642</math></p>	Hundreds	Tens	Ones													<table border="1" data-bbox="981 655 1413 759"> <tr> <td>x</td> <td>300</td> <td>20</td> <td>7</td> </tr> <tr> <td>4</td> <td>1200</td> <td>80</td> <td>28</td> </tr> </table>	x	300	20	7	4	1200	80	28	<table data-bbox="1469 655 1727 1007"> <tr> <td></td> <td>327</td> </tr> <tr> <td>x</td> <td>4</td> </tr> <tr> <td colspan="2"><hr/></td> </tr> <tr> <td></td> <td>28</td> </tr> <tr> <td></td> <td>80</td> </tr> <tr> <td></td> <td>1200</td> </tr> <tr> <td></td> <td><hr/></td> </tr> <tr> <td></td> <td>1308</td> </tr> </table> <p></p> <table border="1" data-bbox="1469 1046 1671 1219"> <tr> <td></td> <td>3</td> <td>2</td> <td>7</td> </tr> <tr> <td>x</td> <td></td> <td></td> <td>4</td> </tr> <tr> <td colspan="4"><hr/></td> </tr> <tr> <td></td> <td>1</td> <td>3</td> <td>0</td> </tr> <tr> <td></td> <td></td> <td>2</td> <td>8</td> </tr> </table> <p>This will lead to a compact method.</p>		327	x	4	<hr/>			28		80		1200		<hr/>		1308		3	2	7	x			4	<hr/>					1	3	0			2	8	
Hundreds	Tens	Ones																																																													
x	300	20	7																																																												
4	1200	80	28																																																												
	327																																																														
x	4																																																														
<hr/>																																																															
	28																																																														
	80																																																														
	1200																																																														
	<hr/>																																																														
	1308																																																														
	3	2	7																																																												
x			4																																																												
<hr/>																																																															
	1	3	0																																																												
		2	8																																																												
Deriving from a known fact				<p>Explore links between multiplication facts and x 10, 100, 1000</p>																																																											

These are the multiplication facts pupils should be able to derive from a known fact

2 100 000	700 000 x 3	70 000 x 30	7000 x 300	700 x 3000	70 x 30 000	7 x 300 000
210 000	70 000 x 3	7000 x 30	700 x 300	70 x 3000	7 x 30 000	
21 000	7000 x 3	700 x 30	70 x 300	7 x 3000		
2100	700 x 3	70 x 30	7 x 300			
210	70 x 3	7 x 30				
<b>21 = 7 x 3</b>						
2.1	0.7 x 3	7 x 0.3				
0.21	0.07 x 3	0.7 x 0.3	7 x 0.03			
0.021	0.007 x 3	0.07 x 0.3	0.7 x 0.03	7 x 0.003		

Use doubling and halving of numbers here..

Knowledge of factors

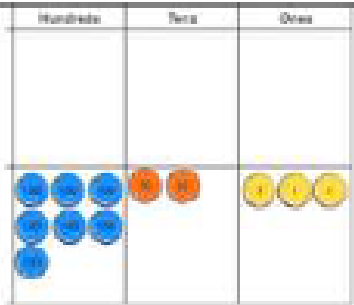
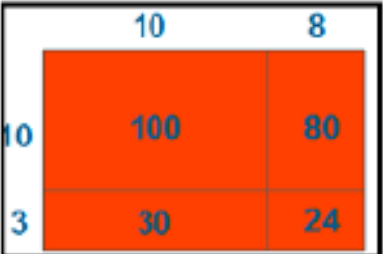

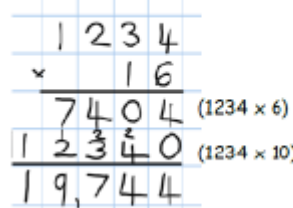
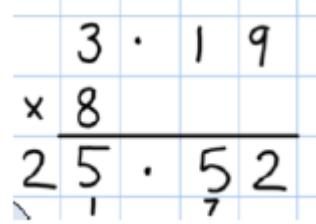


Calculate 6 x 23 using factor pairs  
Two and twelve are factors of 24  
 $6 \times 2 \times 12$  or  $6 \times 12 \times 2$

Three and eight are factors of 24  
 $6 \times 3 \times 8$  or  $6 \times 8 \times 3$

Four and six are factors of 24

$6 \times 4 \times 6$  or  $6 \times 6 \times 4$

<p>Long multiplication</p>			 <p>18 x 3 on the first row (8 x 3 = 24, carrying the 2 for 20, then 1 x 3)</p> <p>18 x 10 on the 2nd row. Show multiplying by 10 by putting zero in units first</p> 	
<p>Multiplying decimals up to 2 decimal places by a single digit.</p>			<p>Remind children that the single digit belongs in the units column. Line up the decimal points in the question and the answer.</p> 	

# Division

## Rec & Year 1

**Equal** – the same

**Sharing** – share equally a number of objects into a specified number of groups.

**Divide** – to carry out the process of division

**Make equal groups** – grouping

**Make equal groups** - sharing

## Year 2

**Sharing** – sharing equally between

**Grouping** - put into groups of

**Divided by** – sharing or grouping

**Inverse** – multiplication and division are inverse operations so  $10 \div 2 = 5$  and  $5 \times 2 = 10$  (it is NOT commutative)

**Even** – numbers that can be divided by 2

**Odd** – numbers that will have a remainder of 1 when divided by 2

## Year 3, 4, 5 and 6

**Dividend** – the number that is being divided into equal parts

**Divisor** – for sharing: the number that it is being shared between. For grouping: the number in each group In  $15 \div 3$ , 15 is the dividend and 3 is the divisor

**Quotient** – the result of a division

dividend  $\div$  divisor = quotient

**Divisible** – A whole number is divisible by another if there is no remainder after division

**Remainder** – the amount remaining after division


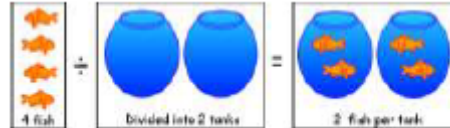
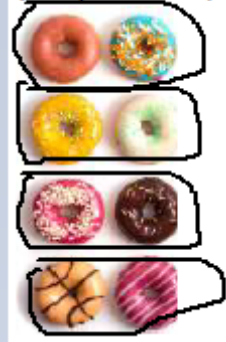
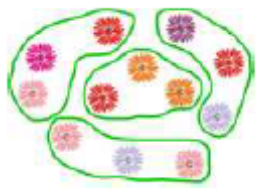
e.g.  $29 \div 7 = 4 \text{ r}1$

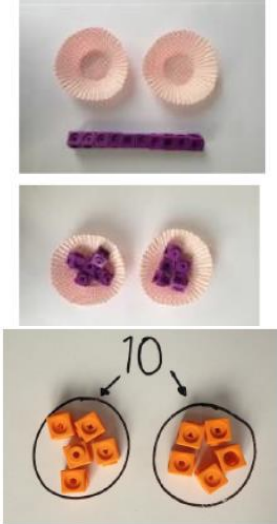
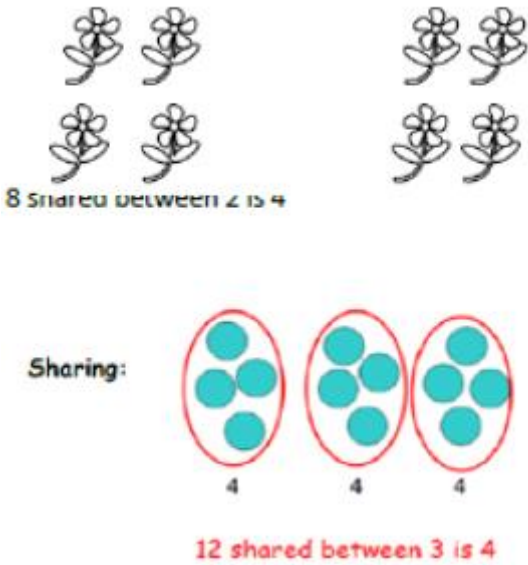
**Scaling** – to reduce a number, quantity or measurement by an amount



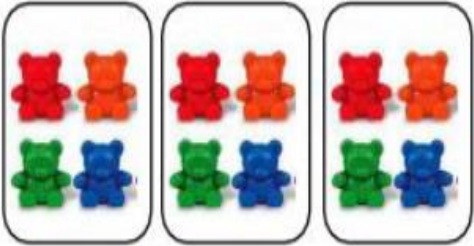
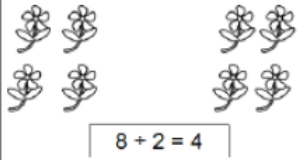
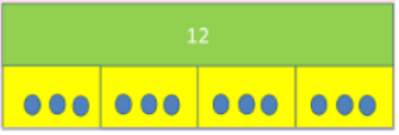
**Short division** – a method used to divide 2 or more digits by a 1 digit number





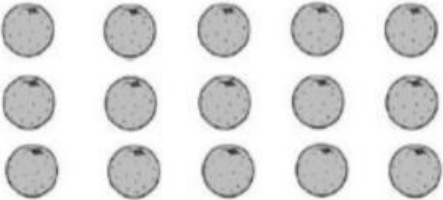
Y6 – Long division

Orders of operations – brackets, indices  $^2$   $^3$   $\sqrt{\quad}$ , multiplication and division, addition and subtraction

Objectives and Strategy:	Concrete	Pictorial	Abstract	Notes
<b>EYFS</b>				
<b>To distribute objects between two people equally.</b>				
<b>To group a collection of objects into equal groups.</b>	 <p>Physically move the objects into groups.</p>	 <p>Draw lines around the objects, dividing them into equal groups.</p>		<p>Worth having a discussion here about identifying odd and even numbers: if the group divides equally, we call this number 'even'. If there are any left over from a set that's been shared equally, we call that number 'odd'.</p>

Objectives and Strategy:	Concrete	Pictorial	Abstract	Notes
Year One				
<p><b>Division as sharing</b></p>	 <p>I have 10 cubes, can you share them equally in 2 groups?</p>	<p>Children use pictures or shapes to share quantities.</p>  <p>8 shared between 2 is 4</p> <p>Sharing:</p> <p>12 shared between 3 is 4</p>	<p>12 shared between 3 is 4.</p>	

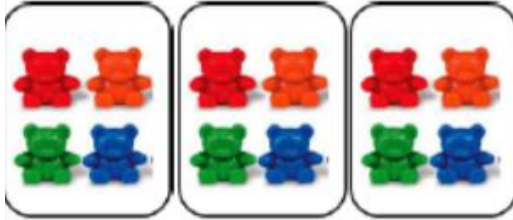
Objectives and Strategy:	Concrete	Pictorial	Abstract	Notes
Year Two				
<b>Division as grouping</b>	<p>Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.</p> 	<p>Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.</p>  <p><math>20 \div 5 = ?</math> <math>5 \times ? = 20</math></p>	$20 \div 5 = 4$	
<b>Division by sharing</b>	 <p>Use a variety of concrete objects to show equal sharing. This is a physical part-whole model.</p>	<p>Children use pictures or shapes to share quantities.</p>  <p>Children use bar modelling to show and support understanding.</p>  <p><math>12 \div 4 = 3</math></p>	$12 \div 4 = 3$	

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

Division with remainders

$14 \div 3 =$

Divide objects between groups and see how much is left over



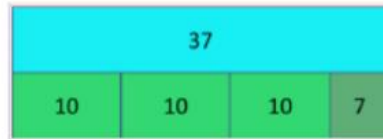
Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.



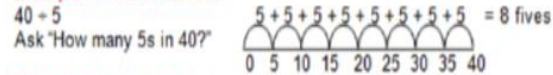
Draw dots and group them to divide an amount and clearly show a remainder.



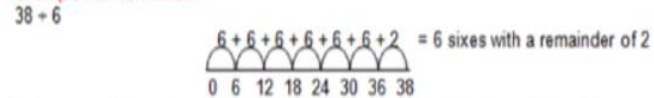
Use bar models to show division with remainders.



Example without remainder:



Example with remainder:



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

Complete written divisions and show the remainder using r.

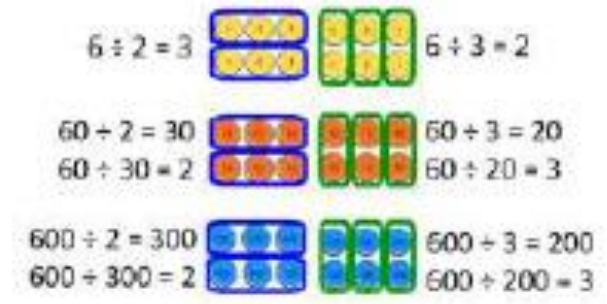
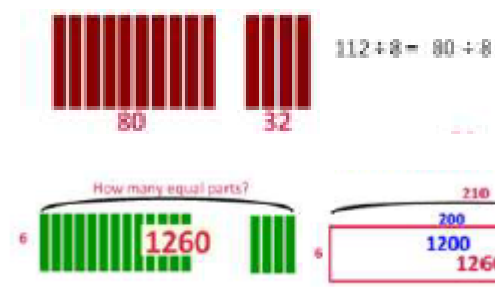
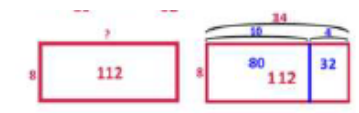
$29 \div 8 = 3 \text{ REMAINDER } 5$

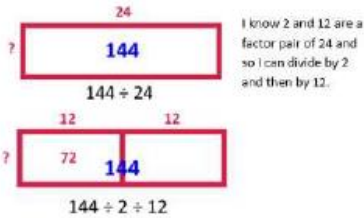
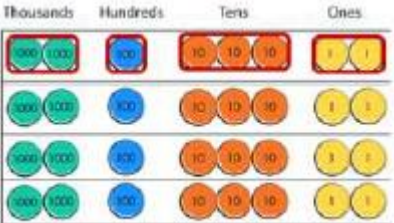
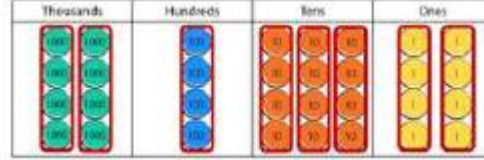
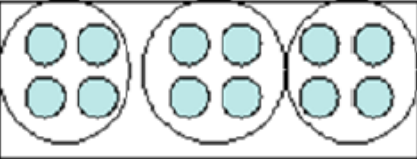

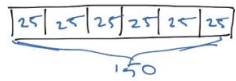
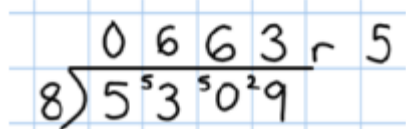
↑   ↑   ↑   ↑

dividend   divisor   quotient   remainder

Objectives and Strategy	Concrete	Pictorial	Abstract	Notes									
Year Four													
	<p><math>96 \div 3</math></p> <table border="0" style="margin-left: 20px;"> <tr> <td></td> <td style="text-align: center;">Tens</td> <td style="text-align: center;">Units</td> </tr> <tr> <td></td> <td style="text-align: center;">3</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="vertical-align: middle;">3</td> <td colspan="2"> </td> </tr> </table> <p>Use place value counters to divide using the bus stop method alongside</p> <div style="display: flex; align-items: center; margin-top: 10px;"> <div style="border-left: 1px solid black; padding-left: 5px; font-size: 8px;">             Calculators  <math>42 \div 3</math> </div> </div> <p><math>42 \div 3 =</math></p> <p>Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.</p> <div style="text-align: center; margin-top: 10px;"> </div> <p>We exchange this ten for ten ones and then share the ones equally among the groups.</p> <div style="text-align: center; margin-top: 10px;"> </div> <p>We look how much in 1 group so the answer is 14.</p>		Tens	Units		3	2	3			<p><a href="https://youtu.be/fq2UXvSMWfs">https://youtu.be/fq2UXvSMWfs</a></p> <p>Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.</p> <div style="text-align: center; margin-top: 20px;"> </div> <p>Encourage them to move towards counting in multiples to divide more efficiently.</p>	<p>Begin with divisions that divide equally with no remainder.</p> $\begin{array}{r} 218 \\ 3 \overline{) 872} \end{array}$ <p>Move onto divisions with a remainder.</p> $\begin{array}{r} 86 \text{ r } 2 \\ 5 \overline{) 432} \end{array}$ <p>Finally move into decimal places to divide the total accurately.</p> $\begin{array}{r} 14.6 \\ 35 \overline{) 511.0} \end{array}$ <div style="margin-top: 20px;"> </div>	
	Tens	Units											
	3	2											
3													

# Year 5/6 Division

Objectives	concrete	Pictorial	Abstract	Notes
Year Five				
Year Six				
Deriving facts from known facts	 <p> <math>6 \div 2 = 3</math>   <math>6 \div 3 = 2</math>  <math>60 \div 2 = 30</math>   <math>60 \div 3 = 20</math>  <math>600 \div 2 = 300</math>   <math>600 \div 3 = 200</math> </p>			<p>Pupils use their growing knowledge of multiplication facts place value and derived facts to multiply mentally understanding the inverse relationship between multiplication and division allows corresponding division facts to be derived.</p>
Using knowledge of multiples	 <p> <math>112 \div 8 = 80 \div 8 + 32 \div 8</math>          How many equal parts?     </p>		$112 \div 8 = 80 \div 8 + 32 \div 8$	

<p>Using knowledge of factors to divide</p>				<p>Pupils explore this strategy when dividing. <math>2 \times 2 = 4</math> and so if you divide by 4 you can be achieved by dividing by two</p>
<p>Objectives 5/6</p>	<p>Concrete</p>	<p>Pictorial</p>	<p>Abstract</p>	<p>Notes</p>
<p>Short division dividing 4-digit numbers by 1-digit numbers</p>	<p>Sharing</p>  <p>Grouping</p> 	<p>Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.</p>  <p>Using the part whole model below, how can you divide 615 by 5 without using short division?</p>  <p>There are 150 students. I want to split them up into 6 groups. How many students would be in each group? <math>150 \div 6 = 25</math></p> 	<p>Begin with divisions that divide equally with no remainder.</p> $\begin{array}{r} 218 \\ 4 \overline{) 872} \\ \underline{8} \phantom{0} \\ 0 \phantom{0} \\ \underline{0} \phantom{0} \\ 0 \phantom{0} \end{array}$ <p>Move onto divisions with a remainder.</p> $\begin{array}{r} 86 \text{ r } 2 \\ 5 \overline{) 432} \\ \underline{4} \phantom{0} \\ 0 \phantom{0} \\ \underline{0} \phantom{0} \\ 0 \phantom{0} \end{array}$ <p>Finally move into decimal places to divide the total accurately.</p> $\begin{array}{r} 14.6 \\ 35 \overline{) 511.0} \\ \underline{35} \phantom{0} \\ 16 \phantom{0} \\ \underline{14} \phantom{0} \\ 21 \phantom{0} \\ \underline{21} \phantom{0} \\ 0 \phantom{0} \end{array}$ 	<p>The thought process of the teacher follows: How many 4s in 8? 2 How many 4s in 5? 1 with 1 remaining How many 4s in 12? 3 How many 4s in 8? 2 Warning: If you simply apply each step, the thinking goes wrong. How many 4s in 8000? 2000 How many 4s in 500? 100 with 1 remaining (illogical) 125. Sharing the dividend builds confidence however doesn't scaffold the thinking process. Using place value counters and a divisor for each power of ten understanding of the short division process. Area models are also useful when used with other strategies and examples.</p>

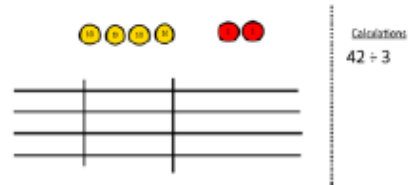
$42 \div 3$

Tens      Units

3            2



Use place value counters to divide using the bus stop method alongside

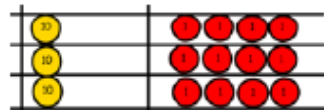


$42 \div 3 =$

Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over

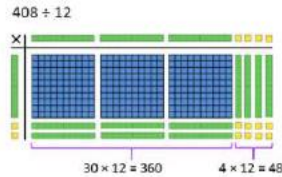


We exchange this ten for ten ones and then share the ones equally among the groups.



We look how much in 1 group so the answer is 14.

Divide a 4-digit number by a 2-digit number



1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
$\begin{array}{r} \text{t o} \\ 2 \overline{) 58} \\ \underline{4} \phantom{0} \\ 18 \end{array}$ <p>Two goes into 5 two times, or 5 tens <math>\div 2 = 2</math> whole tens -- but there is a remainder!</p>	$\begin{array}{r} \text{t o} \\ 2 \overline{) 58} \\ \underline{-4} \phantom{0} \\ 1 \phantom{0} \end{array}$ <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>	$\begin{array}{r} \text{t o} \\ 29 \\ 2 \overline{) 58} \\ \underline{-4} \phantom{0} \\ 18 \end{array}$ <p>Next, drop down the 8 of the ones next to the leftover 1 ten. You combine the remainder ten with 8 ones, and get 18.</p>

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

Notes – If dividing by a number outside of their known number facts pupils should start by recording some multiples of that number.

32	1
64	2
96	3