



# Calculation Policy

April 2021

# + Addition and - Subtraction

Year Group & Vocabulary	Concrete	Pictorial	Abstract						
<p><b>EYFS</b></p> <p><b>Vocabulary:</b> sum, total, plus, add, together, more, parts and wholes, 'is equal to', 'is the same as', less, subtract, take away, fewer</p>	<p><b>Sorting</b> Recognising and comparing amounts that are the same / more / fewer</p> <p><i>Any everyday items that can be used to compare / sort</i></p>	<p>Sort and recognise different representations of the same amount</p>	<p>Use digits to sort, represent and match amounts</p> <p>1 2 3 4 5</p> <p>Number of the Day</p> <table border="1" data-bbox="1524 644 1789 779"> <thead> <tr> <th>Fewer</th> <th>The same as</th> <th>More</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Fewer	The same as	More			
Fewer	The same as	More							
	<p><b>One more / one less</b> Adding one or taking one and identifying the new total</p> <p><i>Finding the Numicon shape with 1 more / 1 less</i></p> <p><i>Use of story mats and concrete objects</i></p>	<p>Use of five / ten frames to add one or subtract one</p> <p>Use of five / ten frames to compare amounts</p> <p><i>This frame has 1 more; this has 1 less</i></p>	<p>Use number line to jump on or back one</p> <p><math>10 + 1 = 11</math></p> <p><math>10 - 1 = 9</math></p> <p>Solving simple addition / subtraction calculations</p> <p><math>4 + 1 = \underline{\quad}</math>      <math>6 - 1 = \underline{\quad}</math>  <math>\underline{\quad} = 5 + 1</math>      <math>\underline{\quad} = 9 - 1</math></p>						

# + Addition and - Subtraction

EYFS

## Concrete

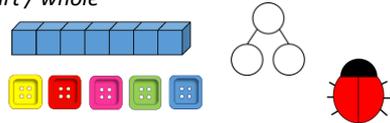
### Number bonds to 5 and 10

#### Combining two groups to make a whole

Finding pairs to total 5 and 10

Adding amounts

Any everyday items that can be used to split into parts or combine. Use of frames that facilitate partitioning e.g. ladybird image, part / whole



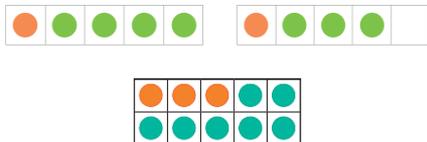
Use of stories / rhymes to provide context for partitioning and combining



Layering up or combining Numicon shapes

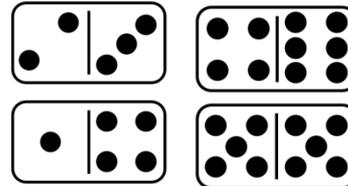


Filling five / tens frames with coloured counters



## Pictorial

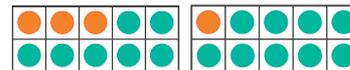
Identifying different ways totals can be represented and making their own representations



Number blocks

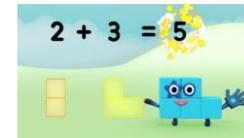


Comparing...same? Different?

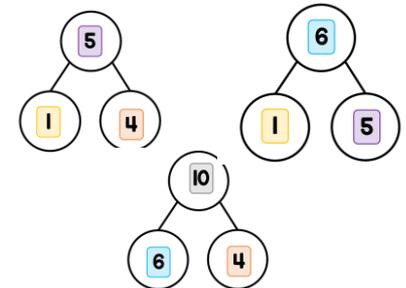
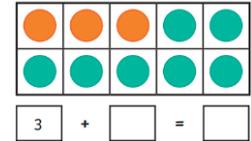


## Abstract

Use digits to make number sentences either alone or in a part-whole model - link digits / calculations to familiar pictorial images

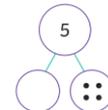


5 = 0 + 5  
5 = 1 + 4  
5 = 2 + 3  
5 = 3 + 2  
5 = 4 + 1  
5 = 5 + 0



Use of part - whole with missing values

5 = \_\_\_ + 4  
4 + \_\_\_ = 5



# + Addition and - Subtraction

EYFS

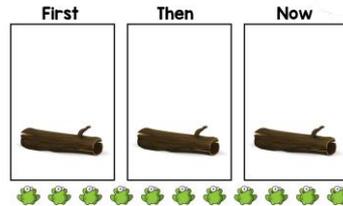
## Concrete

**Adding more**

**Taking away**

Addition and subtraction of numbers up to 10

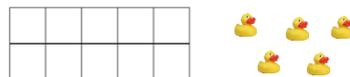
Use of First / Then Now with objects that can be moved to tell an addition / subtraction story



Use of part-whole diagrams with objects that can be moved to tell an addition / subtraction story



Use of frames with objects that can be moved to tell an addition / subtraction story

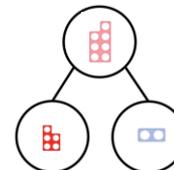
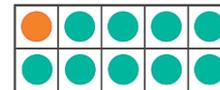
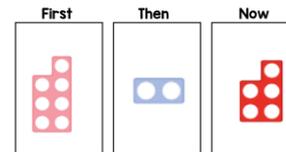
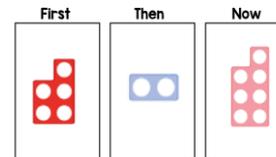


## Pictorial

Identifying what happens to the starting value when more is added or something is taken away

Use of models with pictures / manipulatives that represent more than a single thing and can't be moved

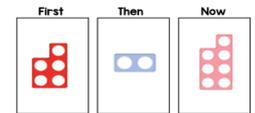
Use of first / then grids to tell the story of the manipulatives



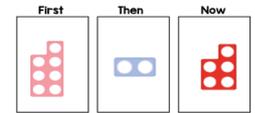
## Abstract

Use digits to make number sentences either alone or alongside a model - link digits / calculations to familiar pictorial images

$$5 + 2 = 7$$



$$7 - 2 = 5$$

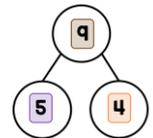


$$9 = 5 + 4$$

$$9 = 4 + 5$$

$$9 - 5 = 4$$

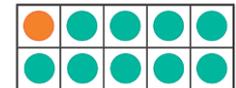
$$9 - 4 = 5$$



Use of frames to construct addition and subtraction sentences

$$10 - 1 = 9$$

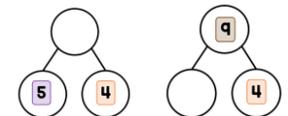
$$9 + 1 = 10$$



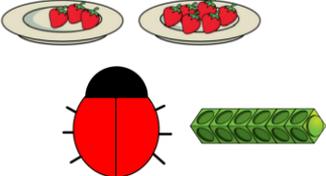
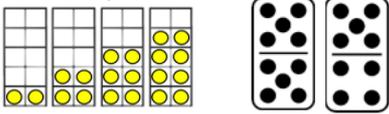
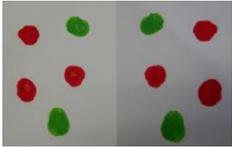
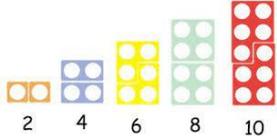
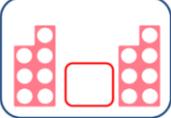
Use of part - whole with missing values to construct addition and subtraction sentences

$$5 + 4 = \underline{\quad}$$

$$9 - \underline{\quad} = 4$$



# x Multiplication and ÷ Division

Year Group & Vocabulary	Concrete	Pictorial	Abstract
<p><b>EYFS</b></p> <p><b>Vocabulary:</b> double, half, halve, share, equally, equal groups of</p>	<p><b>Doubling</b> Recall double facts to 10</p> <p><i>Use of images and single objects that can be moved to facilitate doubling</i></p>  <p><b>Halving and sharing</b> Work out half of numbers to 10 Share an amount equally Recognise when things have not been shared equally</p> <p><i>Use of single objects that can be moved to facilitate sharing equally</i></p>  <p><i>Use of objects that can be grouped equally</i></p>  <p>'Real life' problems "The farmer has 12 carrots and 6 rabbits. How many can they have each?"</p>	<p>Represent doubling with Numicon shapes</p>  <p>Images that show doubling and halving (including non-examples)</p>  <p>Record doubling with marks</p>  <p>Numberblocks</p>  <p>'Real life' sharing problems</p>	<p>Linking digits to representations of doubles</p>  <p>Recording doubles as addition sentences alongside manipulatives / images</p> <p>5 + 5 = 10 </p> <p>3 + 3 = 6 </p> <p>Use of stem sentences verbally / written and alongside familiar pictorial representations</p> <p>Double ____ is ____</p> <p>Half of ____ is ____</p>  <p>'Real life' problems</p>

# x Multiplication and ÷ Division

EYFS

## Concrete

### Odd and Even (links to sharing)

Recognise odd and even numbers  
Know that some numbers cannot be grouped into twos equally

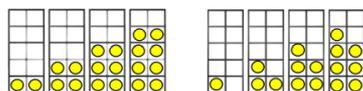
*Use of familiar representations / objects for sorting*



*Use of single objects (including themselves) that can be moved to facilitate sharing equally*

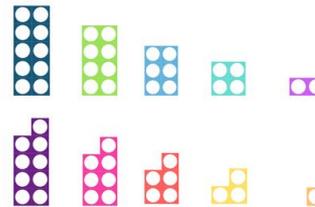


*Share totals to 10 on a tens frame  
Sort between those that share equally and those that do not  
Recognise those that don't sort equally are odd*



## Pictorial

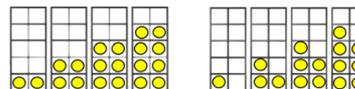
Recognise odd and even in Numicon shapes  
Recognise odd numbers as having an 'extra one'



Numberblocks episodes

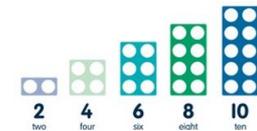
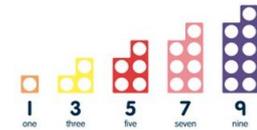


Recognise odd and even in tens frames



## Abstract

Match digits to familiar representations of odd and even numbers

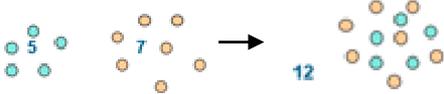
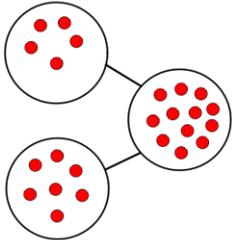
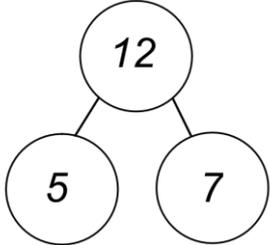
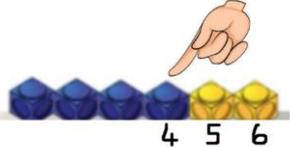
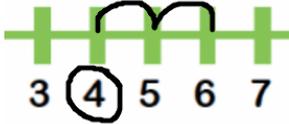
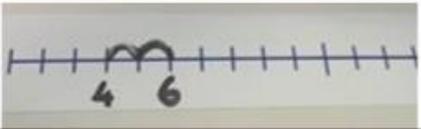


Sort and identify patterns of odd / even in digits

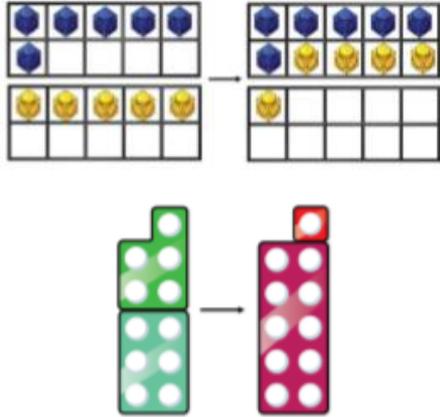
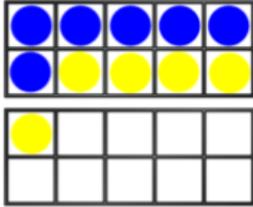
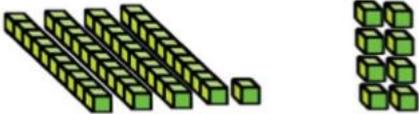
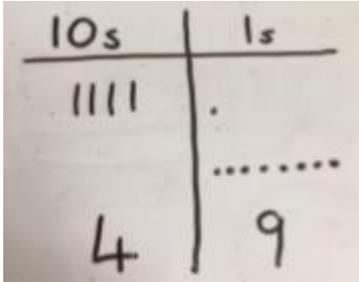


1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

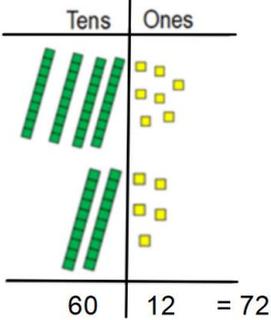
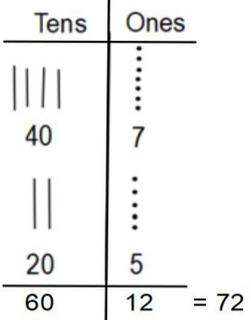
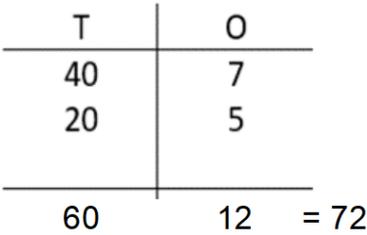
# + Addition

Year Group & Vocabulary	Concrete	Pictorial	Abstract
<p><b>Year 1</b></p> <p><b>Vocabulary:</b> sum, total, plus, add, together, more, parts and wholes, 'is equal to', 'is the same as'</p>	<p><b>Combine two parts to make a whole</b> Combining two sets of objects (aggregation)</p> 	<p>Represent objects as <b>dots/crosses</b> within a <b>part-whole diagram</b>.</p> 	<p><math>4 + 3 = 7</math> <math>7 = 4 + 3</math></p>  <p><b>Calculations should be written either side of the equality sign</b> so that the sign is not just interpreted as 'the answer'.</p>
	<p>Progress onto adding on to a set (augmentation):</p> <p>Encourage children to <b>count on, rather than count all</b>.</p> 	<p>Counting on with a given number line or number track</p> 	<p><b>Missing numbers</b></p> <p>Missing numbers need to be placed in all possible places.</p> <p><math>2 + 4 = \square</math>      <math>\square = 2 + 4</math>  <math>4 + \square = 6</math>      <math>6 = \square + 2</math></p> <p>Encourage children to use an <b>empty number track</b>.</p> 

# + Addition

	Concrete	Pictorial	Abstract								
<p><b>Year 1 continued...</b></p>	<p><b>Regrouping to make 10</b> Using tens frames or Numicon. e.g. <math>6 + 5</math></p> 	<p>Children to draw onto a ten frame.</p> 	<p>Develop an understanding of <b>equality</b>.</p> <p>e.g. <math>6 + 5 = 10 + 1</math></p> <p>Moving onto <b>missing numbers</b>:</p> $6 + \square = 11$ $6 + 5 = 5 + \square$ $6 + 5 = \square + 4$								
<p><b>Year 2</b></p> <p><b>Vocabulary:</b> sum, total, plus, add, together, more, parts and wholes, 'is equal to', 'is the same as'</p>	<p>TO + O using base 10 equipment</p> 	<p>Children to draw representations</p> 	<p>Expanded column addition</p> <table border="1" style="display: inline-table; vertical-align: middle;"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td>40</td> <td>1</td> </tr> <tr> <td></td> <td>8</td> </tr> <tr> <td>40</td> <td>9</td> </tr> </tbody> </table> <p style="text-align: right; margin-right: 20px;">= 49</p>	Tens	Ones	40	1		8	40	9
Tens	Ones										
40	1										
	8										
40	9										

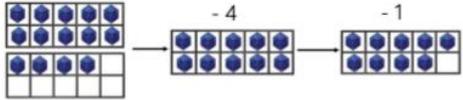
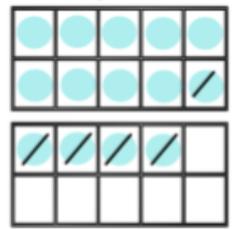
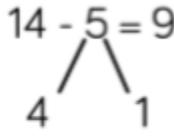
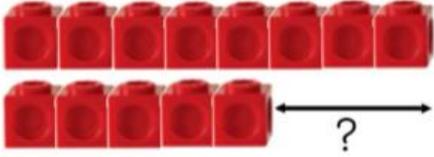
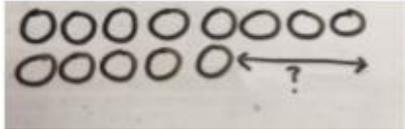
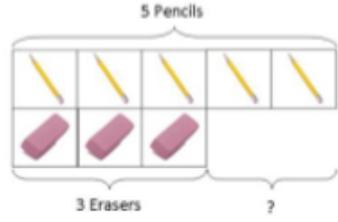
# + Addition

	Concrete	Pictorial	Abstract
<b>Year 2 continued...</b>	<p>TO + TO using base 10 equipment.</p> <p>47 + 25</p>  <p style="text-align: center;">60   12 = 72</p>	<p>Represent base 10 using pictures.</p>  <p style="text-align: center;">60   12 = 72</p>	<p>Expanded column addition (introduced alongside equipment or jottings)</p>  <p style="text-align: center;">60   12 = 72</p>

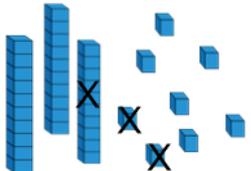
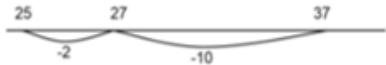
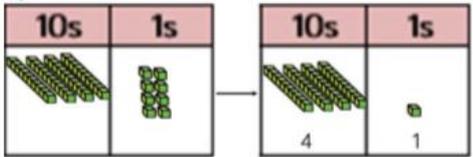
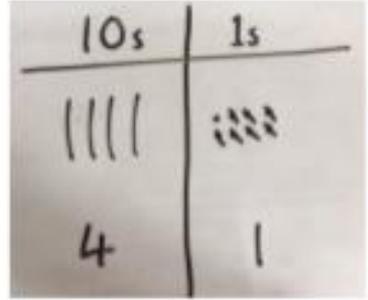
# - Subtraction

Year Group & Vocabulary	Concrete	Pictorial	Abstract
<p><b>Year 1</b></p> <p><b>Vocabulary:</b> subtraction, subtract, take away, distance between, difference between, more than, minus, less than, equals = same as, most, least, pattern, odd, even, digit</p>	<p><b>Physically taking away and removing objects from a whole</b> (tens frames, Numicon, cubes and other items such as beanbags could be used )</p> <p><math>4 - 3 = 1</math></p>	<p>Children to draw the concrete resources they are using and cross out the correct amount. The bar model can be used.</p>	<p>Part-whole diagram and equality</p> <p><math>4 - 3 =</math></p> <p></p> <p><math>4 - 3 =</math></p>
	<p><b>Counting back</b> (using number lines or number track) children start with 6 and count back 2)</p> <p><math>6 - 2 = 4</math></p>	<p>Children to represent what they see pictorially e.g.</p> <p>Use a given number line or number track.</p>	<p>Encourage children to use an empty number line.</p>

# - Subtraction

Year 1 continued...	Concrete	Pictorial	Abstract
	<p><b>Making 10</b> using ten frames. 14- 5</p> 	<p>Children to present the tens frame pictorially and discuss what they did to make 10.</p> 	<p>Children to show how they can make 10 by partitioning the subtrahend.</p> $14 - 5 = 9$  $14 - 4 = 10$ $10 - 1 = 9$
	<p><b>Finding the difference</b> (using cubes, Numicon or Cuisenaire rods, other objects can also be used).</p> <p>Calculate the difference between 8 and 5.</p> 	<p>Children to draw the cubes/other concrete objects which they have used to illustrate what they need to calculate.</p>  	<p>Find the difference between 8 and 5. 8- 5, the difference is ____</p> <p>Children to explore why <math>9-6 = 8-5 = 7-4</math> have the same difference.</p>

# - Subtraction

Year Group & Vocabulary	Concrete	Pictorial	Abstract																
<p><b>Year 2</b></p> <p><b>Vocabulary:</b> subtraction, subtract, take away, difference, difference between, minus</p> <p>tens, ones, partition</p> <p>near multiple of 10, tens boundary</p> <p>less than, one less, two less... ten less... one hundred less</p>	<p>Use partitioning of tens and ones to subtract a 2 digit number from another 2 digit number with no regrouping involved.</p> <p><math>37 - 12 =</math>  <math>37 - 10 = 27</math>  <math>27 - 2 = 25</math></p> 	<p>Children to present the 2 digit number using a pictorial image.</p> <p><math>37 - 12</math> ( subtract 10, subtract 2) = 25</p> 	<p>Children to use a number line to show partitioning of the 2 digit number 10 and 2, then to subtract this from 37 separately.</p> <p><math>37 - 12 =</math></p> 																
	<p>Column method using base 10. 48-7</p> 	<p>Children to represent the base 10 pictorially where no renaming is required</p> 	<p>Children to use the <u>expanded form of column subtraction</u>.</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="border-right: 1px solid black; border-bottom: 1px solid black;">T</td> <td style="border-bottom: 1px solid black;">O</td> <td></td> </tr> <tr> <td></td> <td style="border-right: 1px solid black; text-align: center;">40</td> <td style="text-align: center;">8</td> <td></td> </tr> <tr> <td style="text-align: right;">-</td> <td style="border-right: 1px solid black;"></td> <td style="text-align: center;">7</td> <td></td> </tr> <tr> <td></td> <td style="border-right: 1px solid black; border-top: 1px solid black; text-align: center;">40</td> <td style="border-top: 1px solid black; text-align: center;">1</td> <td style="text-align: center;">= 41</td> </tr> </table>		T	O			40	8		-		7			40	1	= 41
	T	O																	
	40	8																	
-		7																	
	40	1	= 41																

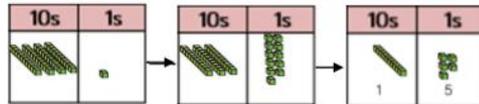
# - Subtraction

Year 2 continued...

Concrete

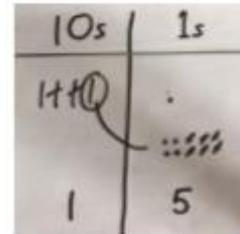
**Column method** using base 10 and having to rename.

41-26



Pictorial

Represent the base 10 pictorially, remembering to show the renaming.



Abstract

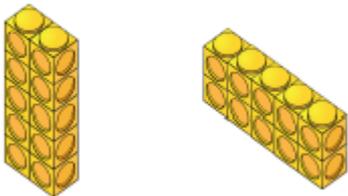
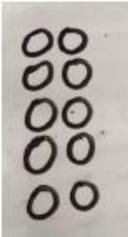
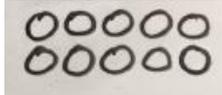
Expanded column method

$$\begin{array}{r|l}
 \text{T} & \text{O} \\
 \hline
 & 30 \\
 \text{40} & 11 \\
 - & 20 \quad 6 \\
 \hline
 10 & 5 = 15
 \end{array}$$

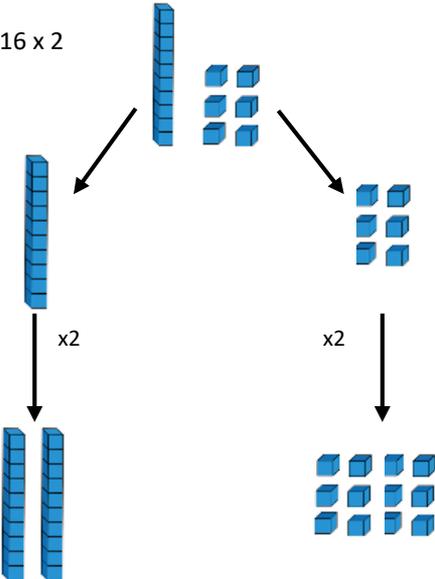
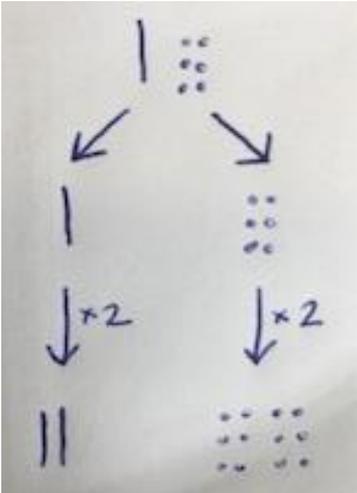
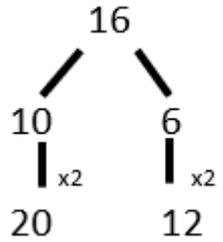
Progressing to the formal column method when ready. Children must understand that when they have renamed the 10 they still have 41 because  $41 = 30 + 11$ .

$$\begin{array}{r|l}
 & 30 \\
 \text{41} & 11 \\
 - & 26 \\
 \hline
 15 &
 \end{array}$$

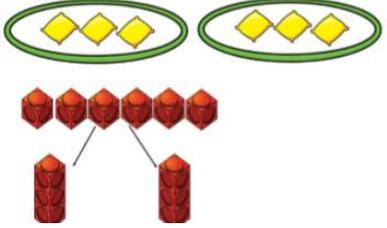
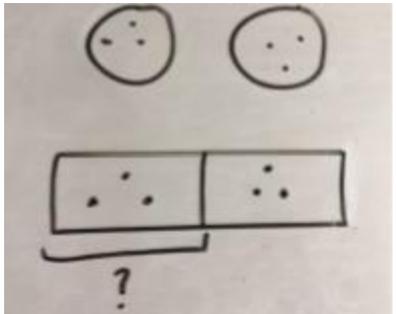
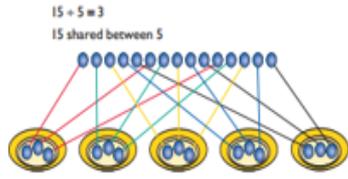
# x Multiplication

Year Group & Vocabulary	Concrete	Pictorial	Abstract
<p><b>Year 1</b></p> <p><b>Vocabulary:</b> multiplication, lots of, groups of, double, arrays, repeated addition</p>	<p><b>Repeated grouping/repeated addition</b> Washing line, and other practical resources for counting. Concrete objects. Numicon; bundles of straws, bead strings etc</p> 	<p>Children to represent the practical resources in a picture and using a number line</p> 	<p><math>2 \times 5 = 10</math>  <math>2 + 2 + 2 + 2 + 2 = 10</math>                  2 multiplied by 5                  5 pairs                  5 jumps of 2</p> <p>Use of coins to represent groups of amounts</p>  <p><math>5 \times 2 = 10</math></p> <p>Abstract number line showing 5 jumps of 2</p>  <p>Use of multiplication to combine amounts (Year 2)</p>  <p><math>5 \times 2 + 2 \times 3</math></p>
	<p><b>Use arrays</b> to understand multiplication can be done in any order (commutative). Counters and other objects can be used</p> <p><math>2 \times 5 = 5 \times 2</math></p>  <p>2 lots of 5      5 lots of 2</p>	<p>Children to represent the arrays pictorially</p>  <p><math>2 \times 5 = 10</math>  <math>5 \times 2 = 10</math></p>  <p><math>5 \times 2 = 10</math>  <math>2 \times 5 = 10</math></p>	<p>Representing multiplication using digits (alongside concrete resources where necessary)</p> <p><math>2 \times 5 = 10</math>  <math>5 \times 2 = 10</math>  <math>10 = 2 \times 5</math>  <math>10 = 5 \times 2</math>  <math>2 + 2 + 2 + 2 + 2 = 10</math>  <math>5 + 5 = 10</math></p>

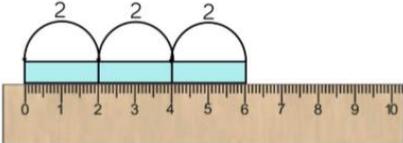
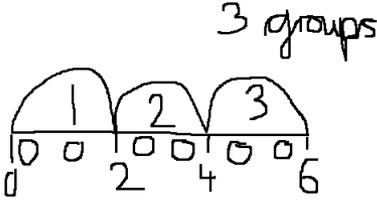
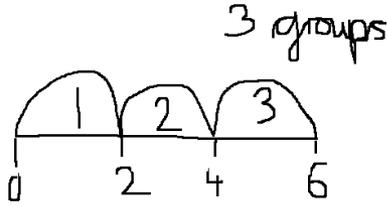
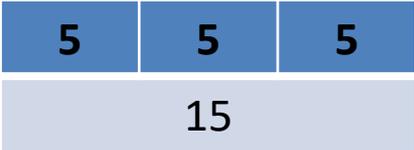
# x Multiplication

Year Group & Vocabulary	Concrete	Pictorial	Abstract
<p><b>Continue to build on the understanding of Year 1 strategies and vocabulary</b></p> <p><b>Year 2</b></p> <p><b>Vocabulary:</b> facts, odd, even, commutative, inverse</p>	<p><b>Doubling</b> - begin to develop an understanding doubling of 2 digit numbers up to 50</p> <p>16 x 2</p> 	<p>Children <b>may</b> start to represent the materials pictorially</p> 	<p>Begin to use jottings <b>towards</b> recording the written method</p> 

# ÷ Division

Year Group & Vocabulary	Concrete	Pictorial	Abstract		
<p><b>Year 1</b></p> <p><b>Vocabulary:</b> share, share equally, one each, two each..., group, groups of, lots of, array</p>	<p>Sharing using a range of objects <math>6 \div 2</math></p> 	<p>Represent the sharing pictorially</p> 	<p><math>6 \div 2 = 3</math></p> <table border="1" data-bbox="1429 428 1883 499"> <tr> <td>3</td> <td>3</td> </tr> </table> <p>Children should also be encouraged to use their 2 times table facts.</p>	3	3
3	3				
	<p><b>Group AND share small quantities- understanding the difference between the two concepts.</b></p> <p><b>Sharing</b> Develops importance of one-to-one correspondence</p> 	<p>Children to draw grouping and sharing small quantities</p> <p><math>15 \div 5 = 3</math></p> <p><b>Sharing</b></p>  <p><b>Grouping</b></p> 			

# ÷ Division

Year Group & Vocabulary	Concrete	Pictorial	Abstract
<p><b>Year 1/2</b></p>	<p><b>Grouping</b> Count how many groups go in to the dividend <math>6 \div 2</math></p>  <p>3 groups of 2</p>	<p>Children to represent counting how many groups go in to the dividend</p> 	<p>Abstract number line to represent that equal groups that have been counted</p> 
<p><b>Year 2</b></p> <p><b>Vocabulary:</b> group in pairs, 3s ... 10s etc equal groups of divide, ÷, divided by, divided into, remainder</p>	<p>Use of cubes to illustrate the whole and parts of division</p> 	<p>Use the bar model to show grouping</p> 	<p>Represent division in a calculation</p> <p><math>15 \div 5 = 3</math></p> <p><math>15 \div 3 = 5</math></p>