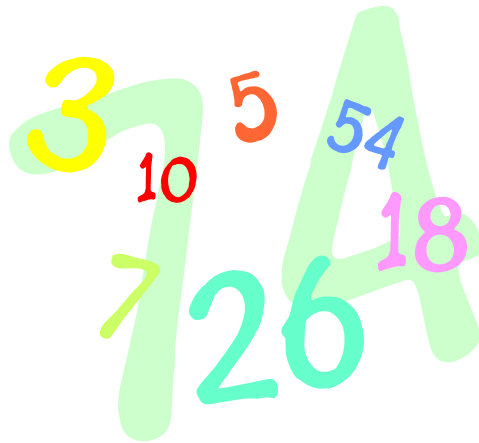


Thomas 'A Becket Infant School

Progression in Calculation Policy



This document is designed to help parents of Thomas A' Becket Infant school to see how the key concepts of number are taught in Maths. We have given each stage a number which begins at one and progresses upwards as the children develop. We haven't put an age or year group by each stage as not all children learn at the same speed or in the same way. If you are unsure which stage your child is at then please do not hesitate to contact your child's teacher. We hope that you find this document helpful so that you have a better understanding of how to support your child at home.

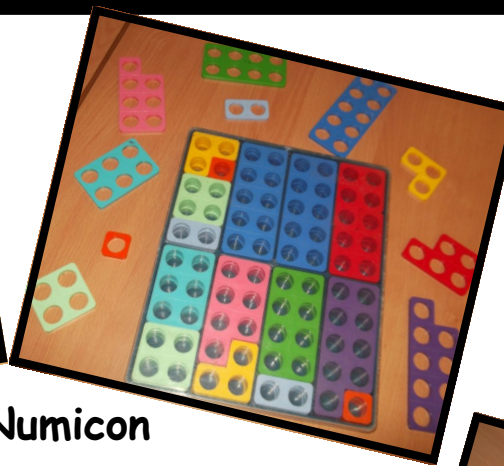
Mrs Wilson 2019



Number Tiles



Dienes



Numicon

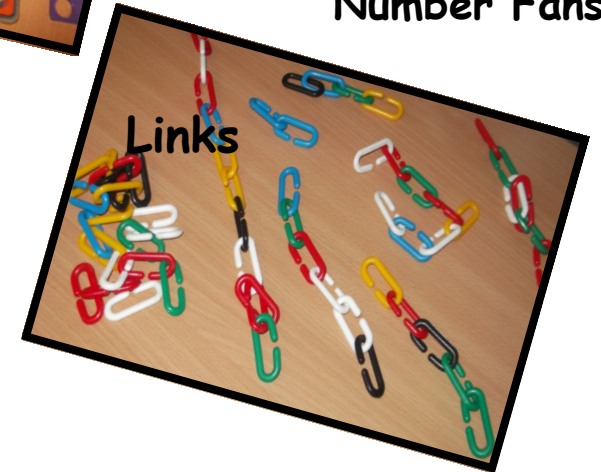


Number Fans



Number beads

Mathematical Resources
and Equipment used at
Thomas A' Becket
Infant School



Links



Counting Objects



Numicon Boards & Pegs

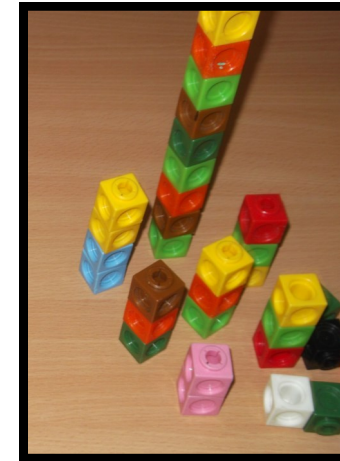


Number Lines

100 Square

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	

Cuisenaire

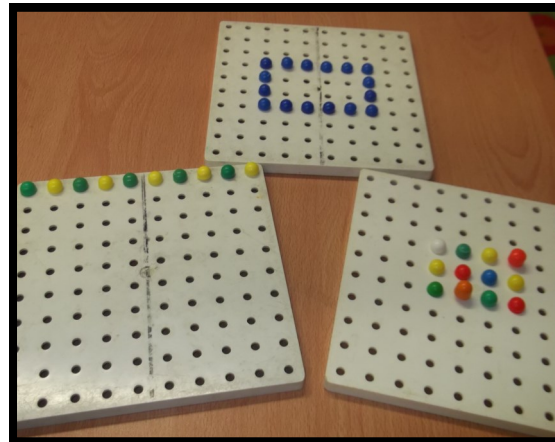


Multilink

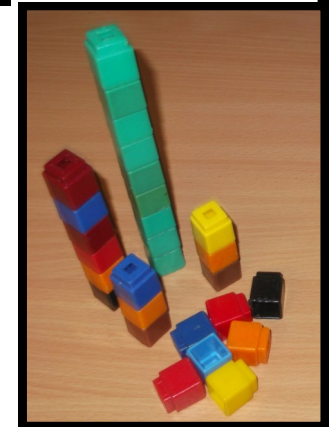
Dice



Peg Boards



Unifix

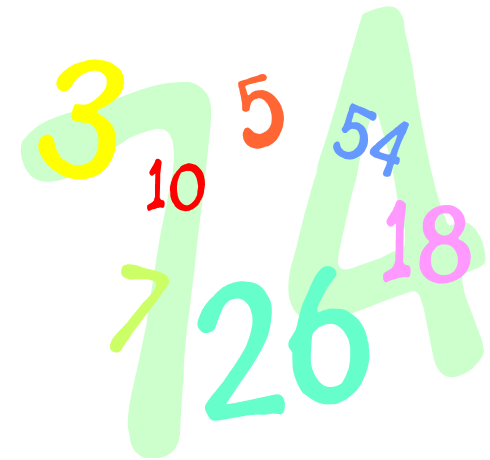
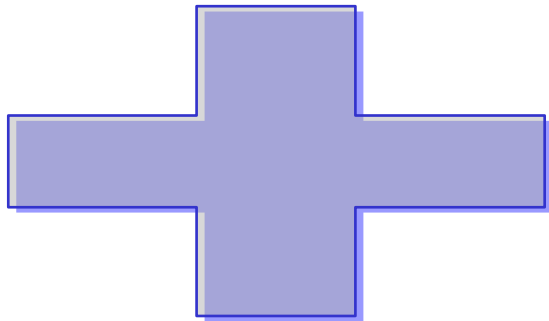


Money

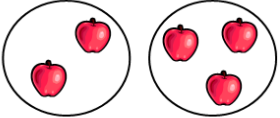



Progression in Addition


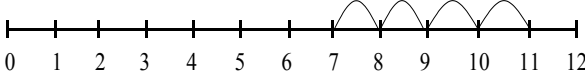

count on, add,
forwards, plus, sum, total, how many altogether?
And, how many more?, score, +, addition, double,
near double, 1 more, 2 more, 10 more,
100 more, is the same as,
balances with and
recombines



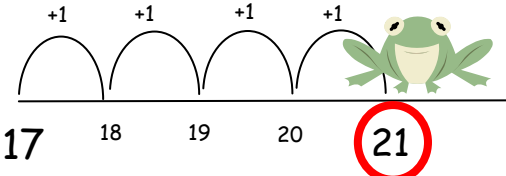

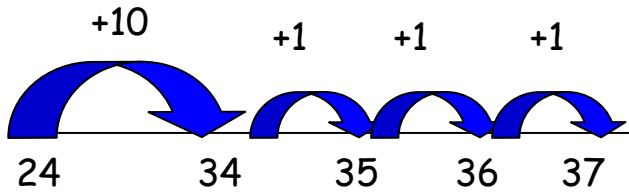
Stage One— Understand addition as combining two groups.

Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?									
<p>I can add one to a small group of objects up to a total of 10 and explain what I am doing.</p> <p>I can count out 1p coins to pay for 2 items totalling up to 10p.</p>	<p>Count on, add, plus, one more than, how many altogether, and, makes, equals, total, 1 more/less</p> <p>How many more? = +</p> <p>What is the number after 5? How will you find out how many there are in total? Can you show me how you worked out 1 more than....?</p>	<p><u>Mostly pictorial representations</u></p> <p>Modelling using quipment (e.g. counters, cubes etc.) the addition of 2 and 3 objects by combining sets. If I had 2 apples and 3 apples how many have I got altogether?</p>  <p>Children use their fingers to work out 1 more</p>  <p>5 and 2 more is 7 2 less than 7 is 5</p> <p>Children don't formally record but are made aware of symbols. + = -</p> <p>Teacher will verbalise and model written method '2 and 3 makes 5' → 2 + 3 = 5</p> <p>Possibly simple number tracks to count up on: What is 1 more than 4?</p> <table border="1" data-bbox="618 1158 1357 1248"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> </tr> </table> <p>Use a Numicon shape and add 1 more to each shape. What number do you have now? Now find the new Numicon shape to cover over the top.</p>	1	2	3	4	5	6	7	8	9	<p>Counting on fingers</p> <p>Visualisation (counting objects to pots and then adding more)</p> <p>Action sums, saying a sum and using arm actions to represent symbols = +</p> <p>Practical activities to add; merging sets and then counting the total.</p> <p>Counting on from one number to find the total.</p> <p>Count the stairs</p> <p>Ordering numbers.</p>	<p>Anything!</p> <p>For example: Fingers, Counting Objects, Numicon, Small world, Bead strings, Unifix, Multilink, Fruit, Toys, 100 square, Number tracks, Songs/ Rhymes, Coins</p>
1	2	3	4	5	6	7	8	9					

Stage Two – Using a number track/number line for addition.

Steps to success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?									
<p>I can use a number track to count on and find the answer to an addition sum up to 10 and then to 20.</p>	<p>Count on add, plus, 1 more than, addition, 1 more, 2 more, 10 more</p> <p>How many altogether? How many more? = + What would be...?</p>	<p>At this stage children will be doing a lot of practical recording using equipment and many will continue to use pictorial representations, gradually moving towards number tracks/lines, (empty) number lines, grids and cards as a visual resource.</p> <div style="text-align: center;">  </div> <p>Children will use number tracks to count up on: What is 5 add 3? What is 3 more than 5?</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td> </tr> </table> <p>Missing Number Sentences $5 + 3 = \square$ $3 + \square = 7$ (recording number statements)</p> <p>Teacher modelling: Drawing jumps on numbered lines to support understanding of the mental method.</p> <p>Children: To create their own jumps using Freddy Frog on a number line and also create their own numbers from an empty number line.</p> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <p>Children are shown that with addition the order of adding does not matter. For example, $3+4=7$ and $4+3=7$. This is known as the associative law.</p>	1	2	3	4	5	6	7	8	9	<p>Hold larger number in head then use fingers to count on number bonds to 10.</p> <p>Put objects in a line, add 1 to the end of the line and count how many altogether.</p> <p>Choose a number, what is X more? Put number cards in order and use to help.</p> <p>Draw a chalk number line/use number tiles, get children to jump like Freddy Frog!</p>	<p>Fingers Compare bears Bead strings Unifix/ multilink Numicon 100 square Number lines Cubes Number cards Chalk</p>
1	2	3	4	5	6	7	8	9					

Stage Three – Using an empty number line for addition.

Steps to success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?
<p>I can use a number line to support the addition of two numbers starting from numbers up to 20 then beyond.</p> <p>I can remember to start with the biggest number and jump on top of the line. My jumps will be the same.</p> <p>I can use a number line more efficiently to add on 2 digit numbers by adding the tens then the ones.</p>	<p>Count on, bigger number, adding, combining, jumps</p> <p>What number will you start with? How many jumps will you need? What do we need to remember about our jumps? What number have you reached?</p>	<p>An empty number line is similar to a number track and uses the same principles of counting in order but there are no numbers to begin with. The children are taught to draw their own number line and start with the biggest number. Initially children will be adding single digits and therefore will be counting in ones, but as the numbers become higher the children will begin to use partitioning.</p> <p>Counting in ones</p> <p style="text-align: center;">$17+4=$</p>  <p style="text-align: center;">Start with the biggest number, jump on top of the line, go from left to right as we are adding and count your jumps!</p> <p style="text-align: center;">There are 50 people on the bus 16 more get on how many altogether?</p>  <p>Partitioning</p> <p>This means splitting the 2 digit number into tens and units</p> <p>E.g.</p> <p>$24+13 =$ \longrightarrow $24+13=37$</p> <p>$24+10 = 34$</p> <p>$34+3 = 37$</p> 	<p>H T U</p> <p>Eg. $300 + 40 + 7$</p> <p>Partition 2 and 3 digit numbers into H T U</p> <p>Number bond facts to 10/20/100- play number bond tennis (say a number, they say the number that makes 10/20/100)</p> <p>Using Dienes counting on by starting with the largest number in a sum, using a number line, square or in their head.</p>	<p>Practical things if still required (see mental stage)</p> <p>number lines</p> <p>100 square coins</p> <p>whiteboards</p> <p>multilink</p> <p>dienes</p> <p>unifix</p>

Stage Four — Partitioning and Recombining

Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?
<p>I can do addition more efficiently by partitioning numbers into tens and ones and then recombining them.</p>	<p>Count on, add, forwards, plus sum, total one more, two more, ten more, hundred more, is the same as, balances with and recombines</p> <p>How many tens altogether? How many units/ones?</p>	<p>This stage uses the children's understanding of place value to simplify the addition process. When partitioning and recombining, it is important to first begin with adding numbers where there is no need to cross any boundaries of ten/hundred e.g. $24+13$ where the 3 and 4 can add to make a number below 10 and the 20 and 10 add to make a number below 100...not $24+17$ as the 4+7 would equal 11- over the ten. Once confident then the boundary can be crossed.</p> <p><u>Partitioning and recombining without crossing the 10/100 barrier.</u></p> <p style="text-align: center;">$34+22=$</p> <p>First partition each number: 30 and 4; 20 and 2 Then add the tens: $30+20 =50$. Then add the units so $4+2 =6$. Finally combine the answers to get your overall total: $50+6=56$ The same rules apply when adding hundreds, tens and units.</p> <p><u>Partitioning and recombining crossing the 10/100 barrier</u></p> <p style="text-align: center;">$47+39=$</p> <p>Same as above, partition the number- 40 and 7, 30 and 9. Add the tens- $40+30= 70$; add the units- $7+9= 16$ then add the totals together, being careful to remember to add on the extra ten- $70+16= 86$ OR $70+16= 70+10+6= 80+6= 86$.</p> <p><u>Crossing the tens should only be done once children are confident in partitioning and recombining within the 10s/100s.</u></p>	<p>Number bonds facts to 10, 20 100</p> <p>Partition 2 and 3 digit numbers into H T U - Play Stamp, Clap, Click- say a three digit number, children stamp the hundreds, clap the tens and click the ones.</p>	<p>Number grids Number lines Numicon Dienes Coins</p>

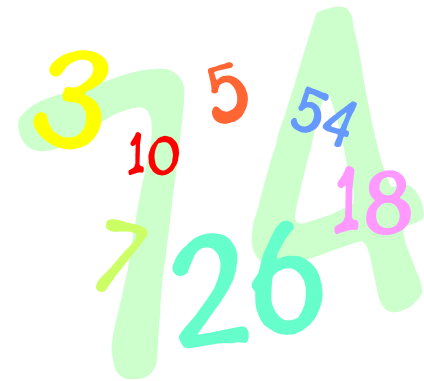
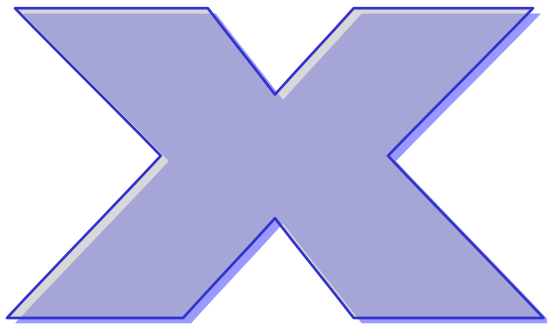
Stage Five — Beginning the column method

Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?
<p>I can add two 2 digit numbers using column addition.</p> <p>I can lay out my work accurately so that the tens and units are in the correct columns</p>	<p>count on, add, forwards, plus sum, total one more, two more, ten more, hundred more, is the same as, balances with and recombines</p> <p>How many tens altogether? How many units/ones?</p>	<p>It is important when using this method that the columns line up with tens under tens and units under units so that it is clear which numbers should be added together. It is important to begin with numbers that do not cross the 10 boundary to begin with and children will often refer back to the partitioning and recombining method (expanded column method) to complete this. In this method, children should add the units first in preparation for more complicated sums later on.</p> <p><u>Column Method (without crossing the ten)</u></p> $37 + 52 = 89$ $\begin{array}{r} 30 + 7 + \\ 50 + 2 + \\ \hline 80 + 9 = 89 \end{array}$ <p><u>Column Method (crossing the ten)</u></p> $200 + 40 + 7$ $100 + 20 + 5$ $300 + 60 + 12 = 372$ $\begin{array}{r} 247 \\ +125 \\ \hline 12 \\ 60 \\ \hline 300 \\ 372 \end{array}$ $\begin{array}{r} \text{T} \quad \text{U} \\ 2 \quad 2 \\ + 3 \quad 5 \\ \quad \quad 7 \quad (2 + 5) \\ 5 \quad 0 \quad (20 + 30) \\ 5 \quad 7 \quad (50 + 7) \end{array}$ $\begin{array}{r} \text{T} \quad \text{U} \\ 4 \quad 6 \\ + 2 \quad 7 \\ 1 \quad 3 \quad (6 + 7) \\ 6 \quad 0 \quad (40 + 20) \\ 7 \quad 3 \quad (60 + 13) \end{array}$	<p>Number bonds facts to 10, 20 100</p> <p>Partition 2 and 3 digit numbers into H T U</p> <p>- Play Stamp, Clap, Click- say a three digit number, children stamp the hundreds, clap the tens and click the ones.</p>	<p>Number grids Number lines Numicon dienes Coins</p>

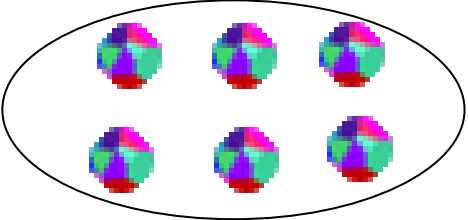
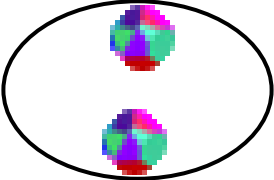
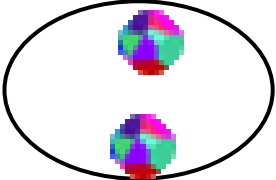
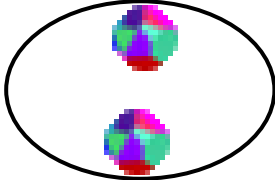
Progression in Multiplication

x number of times, multiply,
multiplied by, multiple of, lots of
once, twice, three times etc..


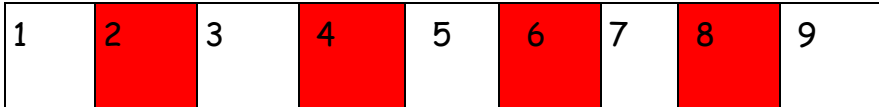
repeated addition, array, row, groups of,
column, double, group in pairs, threes... tens



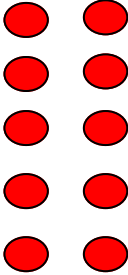
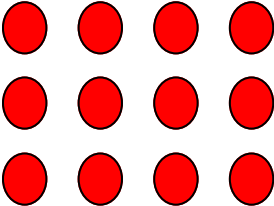
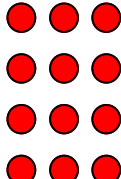
Stage One— Counting through grouping

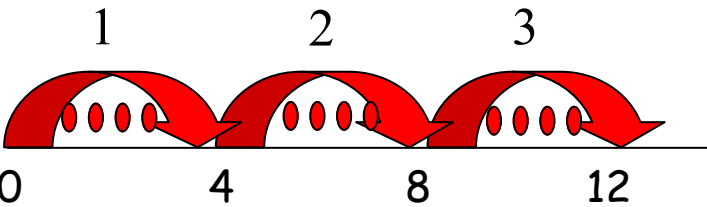
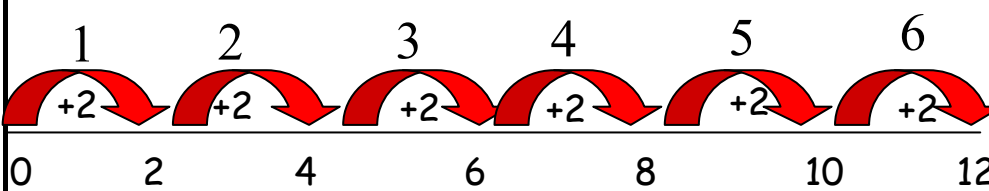
Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?
<p>I can talk about how many in a set and how many altogether.</p> <p>I can use the appropriate vocabulary.</p>	<p>Double, add, add on, count on, Once, twice, three times....</p> <p>How many groups are there?</p> <p>How many items are in each group?</p>	<p>Children will be counting in 2s, 5s and 10s using practical equipment. They will be grouping objects into these denominations as a visual representation.</p> <div style="text-align: center;">  </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"> <div style="text-align: center;">  <p style="font-size: 2em; margin-top: 10px;">2</p> </div> <div style="text-align: center;">  <p style="font-size: 2em; margin-top: 10px;">4</p> </div> <div style="text-align: center;">  <p style="font-size: 2em; margin-top: 10px;">6</p> </div> </div>	<p>Lots of counting games!</p> <p>Counting objects round the house/room in 2s, 10s and 5s</p> <p>Doubling games</p>	<p>Counters Toys Compare bears Socks Buttons Feet/Hands Songs Cubes/Multi-link Gloves</p>

Stage Two— Multiplying through repeated addition

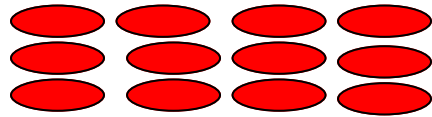
Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?
<p>I can count out groups of equal sizes.</p> <p>I can understand that repeated addition is adding the same number over and over</p>	<p>Add, addition, repeated addition, times, multiply, multiplied by, lots of</p> <p>How many groups are there? How many items are in each group? Are the same number of objects in each group?</p>	<p>Children move on to doubling a number to get used to adding the same number again. From this, children then begin to add the same number more than twice. This is known as repeated addition. E.g.</p> $2 + 2 + 2 = 6$   <p>Children use number tracks/lines to count up on in 2's.</p>	<p>Counting in 2s e.g. counting socks, shoes, animal's legs...</p> <p>Counting in 5s e.g. counting fingers, fingers in gloves, toes</p> <p>Counting in 4's animal legs..</p> <p>Sing counting songs!</p> <p>Play matching games.</p>	<p>Counters Toys Compare bears Socks Buttons Feet/Hands Songs Cubes/Multi-link</p>

Stage Three— Using arrays for multiplication

Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?
<p>I can draw an array to represent a given multiplication</p> <p>I can identify an array and the multiplication that it represents.</p>	<p>Addition, Repeated addition, Columns, Rows, Lots of, groups of, times, multiplied by, multiplication, Equals, commutative Array, grid, representation</p> <p>What have you got? How many times have you got it?</p>	<p>Children will use their newly acquired repeated addition skills to form an array. An array is a pictorial representation of a multiplication calculation. From this the children will begin to understand and recognise the notation for multiplication.</p> <p>$2 + 2 + 2 + 2 + 2 = 2 \times 5$ </p> <p style="text-align: right;">We describe this as '2 five times'.</p> <p>4 multiplied by 3 or 4 three times</p> <p>$4 \times 3 =$ </p> <p>Children will also be shown the commutative law in that multiplications can be done either way.</p> <p>$3 \times 4 =$ </p>	<p>Counting on and back in 1's, 2's, 5's 10's.</p> <p>Look for arrays in real life situations e.g. cake tins, vine tomatoes, fizzy drink packets, chocolate boxes etc</p>	<p>Counters Toys Compare bears Socks Buttons Feet/ Hands Songs Cubes/ Multi-link Number lines.</p>

Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?
<p>I can understand multiplication and represent it as jumps on a number line</p>	<p>Lots of, groups of, times, Multiplied By Repeated addition Eg 2×4...</p> <p>How many do you have in a set?</p> <p>How many times have you got it?</p> <p>How many sets of...?</p>	<p>Children will split the array onto a number line to understand the concept of counting on repeatedly. They are encouraged to 'count the jumps' as they go to make sure they are multiplying the right number of times. E.G. $4 \times 3 =$</p>  <p>The objects are then taken away and the children are able to use their counting skills to solve multiplication sentences using an empty number line. E.G. $2 \times 6 =$</p> 	<p>Counting on and back in 1's, 2's, 5's, 10's.</p> <p>Look for arrays in real life situations e.g. cake tins, vine tomatoes, fizzy drink packets, chocolate boxes etc</p>	<p>Cubes Arrays Bags/sets Number lines Counters Cubes</p>

Progression in Multiplication Lesson Guidance

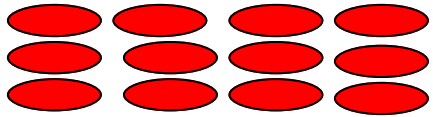


Begin with array

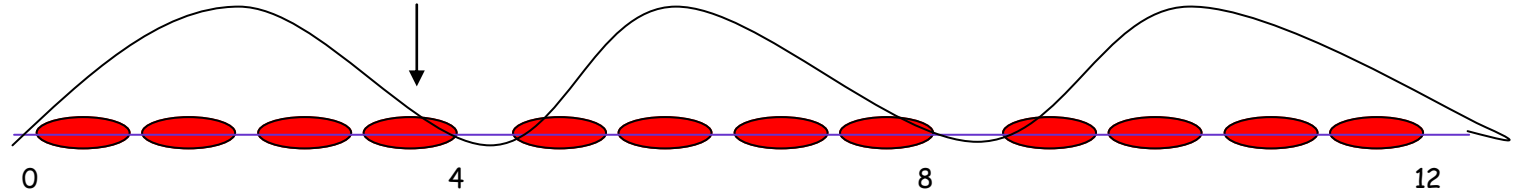
Repeated addition $4+4+4=12$

Multiplication sentence $4 \times 3 = 12$

(Could at this point introduce division—how many 4s are there in 12, introduce incrementally in plenaries)



Physically change the array into rows on the Interactive white board.

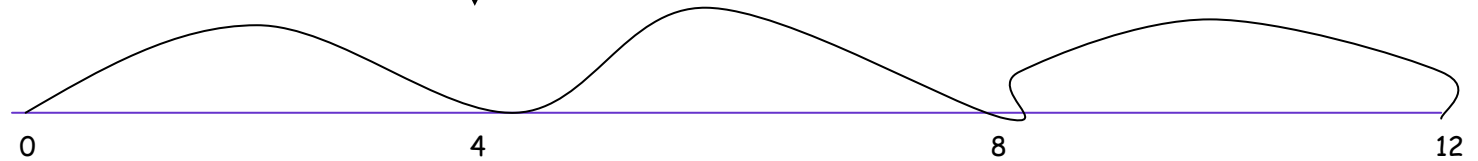


Interactive teaching programmes can be used with this—grouping and bead bar.

Once the image is in place what are the different number sentences?

$$4+4+4=12$$

$$4 \times 3 = 12$$



As above but without the counters—use the number line on the Interactive teaching programmes.

Context of problems

Cuisenaire—introduce by playing (staircase, children to feel the size behind their back). Move on to using the ones as a measure—how many ones in 5. How many ways could you make the 12 rod with the same rods? E.g. $1 \times 12 = 12$ $2 \times 6 = 12$ $3 \times 4 = 12$ $4 \times 3 = 12$

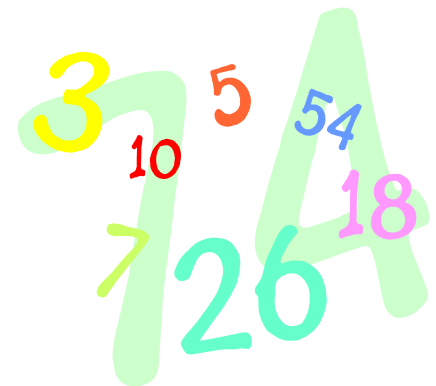
Arrays—How many numbers can you not make an array from?

Square numbers—what arrays make squares? What are the multiplication sentences?


Progression in Subtraction

Subtract, take away, minus, leave,
how many are left/left over?

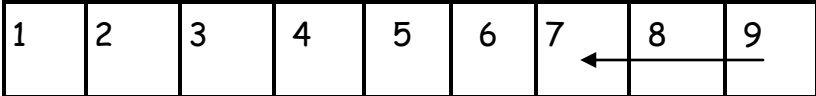

1 less, 2 less, 10 less,
20 less, 100 less, difference between,



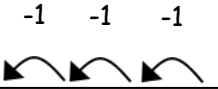
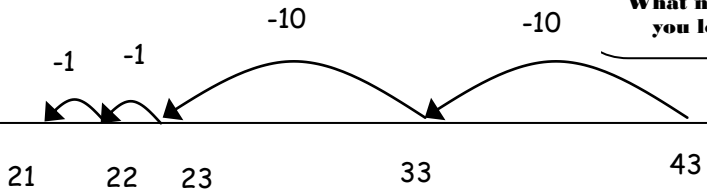
Stage One— Understand subtraction as practically taking away objects.

Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?																		
<p>I can subtract one from a small group of objects to 10, then 20.</p> <p>I can subtract a small number of objects from 10, then 20.</p>	<p>Count back (from to), take away, leave, minus, how many are left/left over? one less, two less, ten less, = - what is the difference between?</p> <p>If I take 2 apples, how many will be left over? What if....?</p> <p>If you count back 4 from 10, what number do you get?</p> <p>What number is 2 less than 8?</p>	<p>Mostly pictorial representations</p> <p>Using models of concrete apparatus (e.g. socks/apples/ unifix etc) to demonstrate how you can take a smaller number away from a larger number.</p> <p>There were 10 socks on the washing line and 2 blew away How many are left?</p>  <p>Children can draw 10 circles (as socks) and cross out 2 before counting what is left. Or children can use 10 objects and physically take 2 away before counting what is left. They could also use their fingers.</p> <p>Children don't have to formally record but are made aware of symbols - =</p> <p>Teacher will verbalise and model written method.</p> <p style="text-align: center;">10 take away 2 leaves 8 10-2 = 8</p> <p>Possibly simple number tracks to count back from. What is one less than 8?</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="width: 20px; text-align: center;">1</td> <td style="width: 20px; text-align: center;">2</td> <td style="width: 20px; text-align: center;">3</td> <td style="width: 20px; text-align: center;">4</td> <td style="width: 20px; text-align: center;">5</td> <td style="width: 20px; text-align: center;">6</td> <td style="width: 20px; text-align: center;">7</td> <td style="width: 20px; text-align: center;">8</td> <td style="width: 20px; text-align: center;">9</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="text-align: center;">←</td> <td></td> <td></td> </tr> </table> <p>Use a Numicon shape 8 and cover it with the 1 shape. What number do you have now? Now find the new Numicon shape that makes this number.</p>	1	2	3	4	5	6	7	8	9							←			<p>Use your fingers to count how many are left</p> <p>Visualisation (count a group of objects. Take objects away and count how many are left over)</p> <p>Singing songs that involve taking away and physically moving- (5 currant buns, 5 little speckled frogs, 10 green bottles)</p> <p>Counting back from a number to find a total.</p>	<p>Anything!</p> <p>For example: Fingers, Compare Bears, Bead strings, Unifix/ multilink, Fruit, Toys, Pencils, 100 squares, Number tracks/lines, Songs/Rhymes, Coins Numicon</p>
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						←																

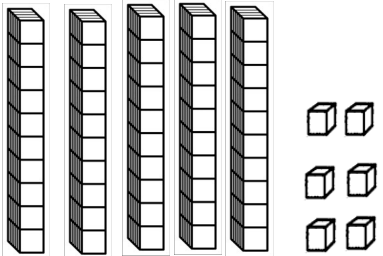
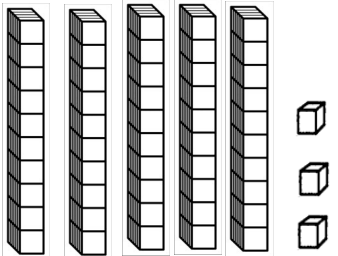
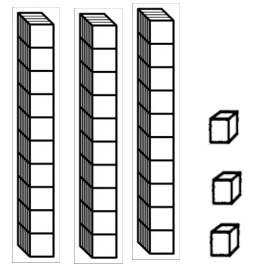
Stage Two – Using a number track/number line for subtraction

Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?
<p>I can use a number track to count back and find the answer within 20.</p> <p>I can use a 100 square to count back and find the answer to a given question with numbers beyond 30.</p>	<p>Count back, take away, subtract, minus, less than, = -</p> <p>Difference between, equals, leaves, estimate</p> <p>Find the number that is 1 less than....?</p> <p>2 less than....?</p> <p>Where do you land if you count back 4 places from 8?</p> <p>How many is 5 less than 9?</p> <p>How many between?</p> <p>What would be...?</p>	<p>At this stage children will be doing a lot of concrete work using number tracks and number lines. Many will still use pictorial representations, gradually moving towards number tracks/lines.</p> <p>Children will use number tracks to count back from: What is 9 subtract 2?</p> <div style="text-align: center;">  </div> <p>Filling in an empty number in a box: $9 - 2 = \square$ $9 - \square = 7$</p> <p>Teacher Modelling: Drawing jumps on numbered tracks/lines to support understanding of the mental method.</p> <p>Children: To create jumps backwards on a number track/line and also create their own numbers from an empty number line.</p> <div style="text-align: center;"> $17 - 2 =$ </div> <div style="text-align: center;">  </div>	<p>Singing songs that involve taking away and physically moving</p> <p>5 currant buns, 5 little speckled frogs, 10 green bottles 5 little ducks</p>	<p>Number tracks/lines to 10</p> <p>Number tracks/lines to 20</p> <p>Number tracks/lines to 30</p> <p>Number tracks/lines to 100</p> <p>100 Squares</p>

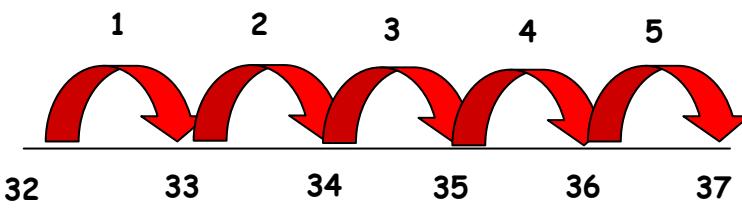
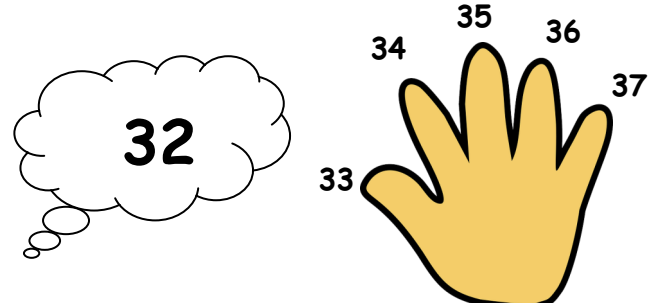
Stage Three — Using an empty number line for subtraction

Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?				
<p>I can use number lines to subtract of two numbers up to 20, then beyond.</p> <p>I can remember to start with the biggest number and dig below the line.</p> <p>I can use a number line more efficiently to subtract a 2 digit number by subtracting the tens first then the units (progress to 3 digits after this)</p> <p>I can use a number line accurately to help me solve subtraction problems.</p>	<p>Count back, (from, to) count back in ones, less than, take away, minus, subtract, leaves, equals, subtract</p> <p>Where are you going to start your number line?</p> <p>Which number are you going to start with?</p> <p>How many digs back do you need to do?</p> <p>What do you need to remember about your digs?</p> <p>What number have you reached?</p>	<p>An empty number line is similar to a number track and uses the same principles of counting in order but there are no numbers to begin with. The children are taught to draw their own number line and start with the biggest number. Initially children will be subtracting single digits and therefore will be counting backs in ones, but as the numbers become higher the children will begin to use partitioning.</p> <p><u>Counting back in ones</u></p>  <p><u>Counting back by Partitioning</u></p> <p>This means splitting the 2 digit number into tens and units.</p> 	<p>Partition 2 digit numbers into tens and units</p> $23 = 20 + 3$ <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">T</td> <td style="text-align: center;">U</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> </table> <p>Number Bond facts to 10/20/100</p> $5 + 5 = 10$ $10 - 5 = 5$ <p>Counting backwards from any number</p> <p>Empty number lines</p> <p>Counting up from a smaller number to a larger using a number line,</p> <p>Mentally or practically using objects.</p> <p>Doubling/Halving Facts</p> <p>Finding nearest ten to help subtract 9 or 11</p>	T	U	2	3	<p>Numicon to use on the number line. (visual image)</p> <p>Dienes to use on the number line. (visual image)</p> <p>Number Lines</p> <p>100 squares</p>
T	U							
2	3							

Stage Four — Partitioning and Recombining

Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?																																																	
<p>I can partition the number being subtracted into tens and units</p> <p>I can subtract the units and then the tens for 2 digit subtraction calculations.</p> <p>I can partition the number being subtracted into hundreds, tens and units.</p>	<p>Subtract, take away, minus, less than, tens, units, partition, inverse, total, equals, count back, 1 less, 10 less,</p> <p>What is the number you are subtracting? How many tens are you subtracting? How many units are you subtracting? What is the total now?</p>	<p>Before starting this stage children need to be confident in their understanding of partitioning tens and units and place value. This can be recorded initially as a number line so that children can see the link between the previous recording method and this one.</p> <p>$56 - 23 =$</p>  <p style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block;">It is important for children to use Dienes/Numicon as this will act as a strong visual image.</p> <p>$56 - 3 = 53$ (subtract the ones first) What do you have left?</p>  <p>$53 - 20 = 33$ (subtract the units second) What is the answer?</p>  <p>$50 - 56 - 23 = 33$</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>A 100 square can be used to jump up for 10's and back for units.</p> <table border="1" style="width: 100%; text-align: center;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr> <tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td></tr> <tr><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td></tr> <tr><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td></tr> <tr><td>41</td><td>42</td><td>43</td><td>44</td><td>45</td><td>46</td><td>47</td></tr> <tr><td>51</td><td>52</td><td>53</td><td>54</td><td>55</td><td>56</td><td>57</td></tr> <tr><td>61</td><td>62</td><td>63</td><td>64</td><td>65</td><td>66</td><td>67</td></tr> </table> <p>← ↑</p> </div> <p style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block;">With practise, some children may eventually be able to do this method mentally. Initially it is important to give calculations where the ones and tens digits do not cross the tens boundary.</p>	1	2	3	4	5	6	7	11	12	13	14	15	16	17	21	22	23	24	25	26	27	31	32	33	34	35	36	37	41	42	43	44	45	46	47	51	52	53	54	55	56	57	61	62	63	64	65	66	67	<p>Partitioning 2/3 digit numbers into hundreds, tens and units.</p> <p>Number bonds facts to 10, 20 100, e.g. 10-8, 90-20, 13-7</p> <p>Play Stamp, Clap, Click- say a three digit number, children stamp the hundreds, clap the tens and click the ones.</p> <p>Representing two/ three digit numbers using maths resources/ equipment, such as Dienes.</p>	<p>Numicon</p> <p>Dienes</p> <p>Number Lines</p> <p>100 squares</p> <p>Place Value Cards</p>
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61	62	63	64	65	66	67																																															

Stage Five – Understanding subtraction as difference between

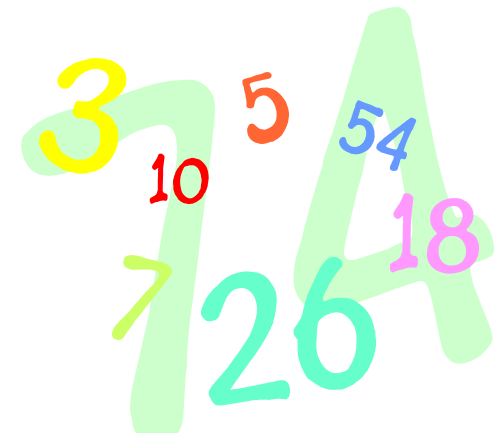
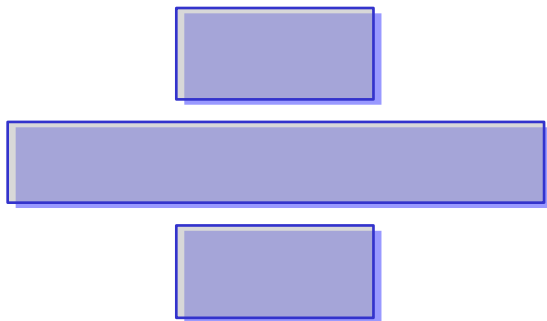
Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?
<p>I can use a number line to find the difference between two numbers by counting on.</p> <p>I can use a number line to help me solve subtraction problems involving money and measures, using the method of counting on.</p>	<p>Count on, difference between, how many more than...how many between? How far apart? Equals, inverse</p> <p>Where are you going to start your number line? Which number are you starting with? Which number are you going to stop at? How many jumps on did you do? What was the difference between the numbers?</p>	<p>What is the difference between 32 and 37?</p> <p>Children can use Numicon/Dienes to create both the numbers they are finding the difference between, laying them on top of each other to see the visual difference.</p> <p>Children are now taught to 'count on' from 32 to 37 to find the difference between. Initially they can do this on a number line before doing it mentally.</p> <p style="text-align: center;">The difference between 32 and 37 is 5</p>   <p>Then count the fingers to find the difference...</p>	<p>Counting games Magic Number game- children sit down when they get to the magic number- counting backwards.</p>	<p>Number tracks Number grids Number lines Numicon Dienes Counting Objects Coins</p>

Stage Six — Beginning the column method

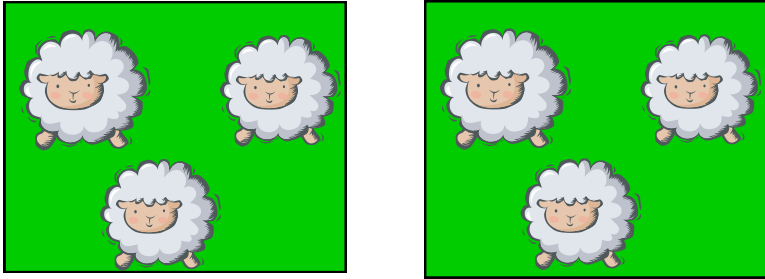
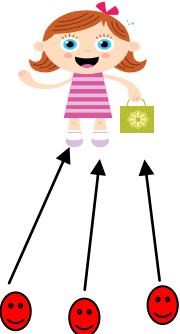
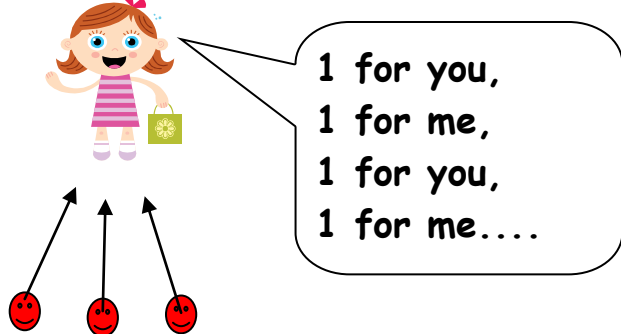
Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?
<p>I can subtract two digit numbers using the column method.</p> <p>I can lay out my work clearly so that the tens and units are in the correct columns..</p>	<p>Subtract, take away, minus, leave, column, tens, units, carry over, total, equals, count back,</p> <p>What number are you subtracting? What is...take away...? Partition the number into tens and units...How many tens? How many units? What is the total now?</p>	<p>It is important when using this method that the columns line up with tens under tens and units under units so that it is clear which numbers should be subtracted. It is important to begin with numbers that do not cross the 10 boundary and children will often refer back to the partitioning and recombining method (expanded column method) to complete this. In this method, children should subtract the units first in preparation for more complicated sums later on.</p> <p><u>Column Method (without crossing the ten)</u></p> <p>Using partitioning and recombining:</p> $457 - 226 = 231$ $\begin{array}{r} 400 + 50 + 7 \\ 200 + 20 + 6 \\ \hline 200 + 30 + 1 \\ \hline = 231 \end{array}$ <p><u>Column Method (crossing the ten)</u></p> $534 - 265 = 269$ $\begin{array}{r} 400 \quad 120 \quad 14 \\ 500 + 30 + 4 \\ 200 + 60 + 5 \\ \hline 200 + 60 + 9 = 269 \end{array}$ $\begin{array}{r} 6712 \\ 56 \\ \hline 16 \end{array}$	<p>Partitioning 2/3 digit numbers into hundreds, tens and units.</p> <p>Number bonds facts to 10, 20 100.</p> <p>Play Stamp, Clap, Click- say a three digit number, children stamp the hundreds, clap the tens and click the ones.</p> <p>Representing 2/3 digit numbers using maths Resources/ equipment, such as Dienes.</p>	<p>Number grids Number lines Numicon Dienes Coins</p>

Progression in Division


Share, share equally, one each, two each...,
group in pairs, threes, tens, equal groups of,
divide, divided by, divided into,
left, left over, how many...?,
group, set, remainders



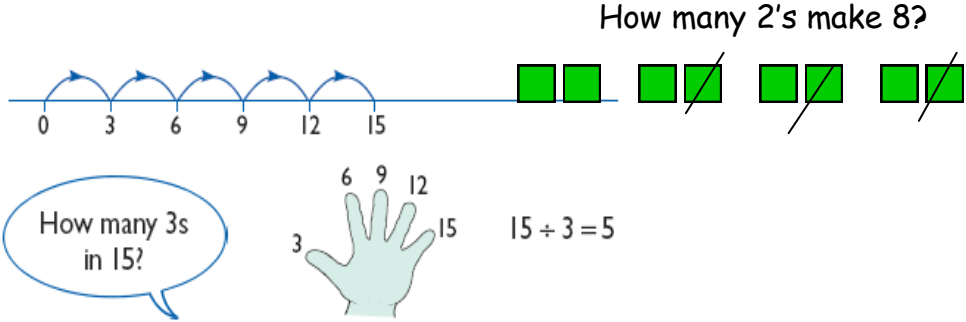
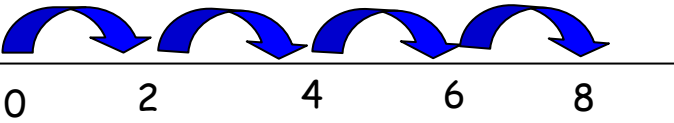
Stage One – Understand Division as Sharing

Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?
<p>I can share objects equally between people .</p>	<p>Share, share equally, share between, share fairly, halve</p> <p>How many each? How many in each group? Is that number of objects shared equally? Can the number of objects be shared fairly? Is the number odd or even?</p>	<p>At this stage children are introduced to the operation of division as 'sharing equally'. This is done practically with no formal recording. Children will mainly use concrete apparatus and practical activities to divide. They will also use real life and role play sessions to reinforce their understanding.</p> <p style="text-align: center;">There are 6 sheep. Can you share the sheep equally so that each field has the same number of sheep in?</p> <div style="display: flex; justify-content: space-around; align-items: center;">  </div> <p>Can you share these sweets out equally so they both have the same amount? How many each? Teacher will model how to record and write a number sentence. Explain that dividing by 2 is the same as halving.</p> <div style="display: flex; align-items: center; justify-content: center;">  <div style="margin: 0 20px; text-align: center;"> $6 \div 2 =$ </div>  </div> <p style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block; margin-left: 10px;"> 1 for you, 1 for me, 1 for you, 1 for me.... </p> <p>Children will physically share objects between 2 groups/people and count how many each group has.</p>	<p>Sharing in real life contexts, e.g. fruit, sweeties, teddies, resources</p> <p>Halving even numbers to 10 using counters and teacher to model $1/2$ of 10 = 5 $10 \div 2 = 5$</p> <p>Use Numicon to explore how many shape cover another larger one. E.g how many 2 shapes cover an 8 shape?</p>	<p>Anything!</p> <p>Care bears, Counters Small toys Buttons Cubes Pegs Pairs of socks Fingers songs role play, Fruit/food,</p>

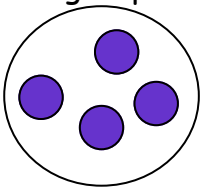
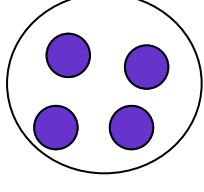
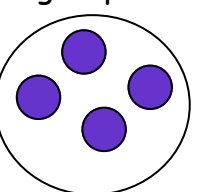
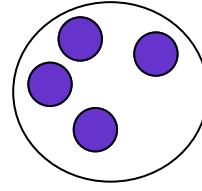
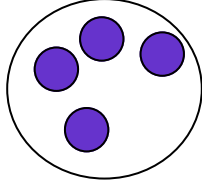
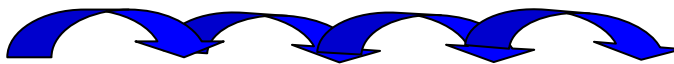
Stage Two — Understand Division as Grouping

Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?
<p>I can group a number of objects in 2's, 10's and 5's.</p> <p>I can understand division as 'How many in?'</p> <p>I can use my times tables to help me solve division problems.</p>	<p>Share, share equally, share between, divide, repeated subtraction,</p> <p>How many each? How many groups have you got? What are you going to count in? How many groups of.....are in.....?</p>	<p>Children begin to understand the operation of grouping. How many groups have we got?</p> <div style="text-align: center;">  </div> <p>How many are in each group? Children find different ways to record, teacher models recordings.</p>	<p>Share fruit/sweets with a friend .</p> <p>Cut and share a pizza.</p> <p>Playing cards. Grouping cards together.</p> <p>Sharing beads / loombands when playing games.</p> <p>Rote practise of times tables.</p>	<p>Counters Small toys Food Buttons Cubes Pegs Pairs of socks Fingers Songs Cards Role play</p>

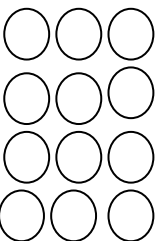
Stage Three – Division on a Number Line

Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?
<p>I can understand division as repeated subtraction.</p> <p>I can understand division and represent it as equal digs on a number line.</p>	<p>Share, share equally, one each, two each..., group in pairs, threes, tens, equal groups of, divide, ÷, divided by, divided into, left, left over, how many...?, group, set remainder</p>	<p>At this stage children will be consolidating their understanding of division as 'sharing equally' and begin to work more on division as grouping and ways of recording.</p> <p>Children are encouraged to use different strategies for grouping.</p> <div style="text-align: center;">  <p>How many 2's make 8?</p> <p>How many 3s in 15?</p> <p>$15 \div 3 = 5$</p> </div> <p>Children are encouraged to form a link between division and multiplication by using arrays.</p> <p>Children use grouping as a strategy to solve simple division problems and begin to use an empty or marked number lines to record their calculations</p> <div style="text-align: center;">  <p>Children record on a marked number line</p> </div>	<p>During this stage some children will still use many ideas from the previous stage but should begin to move on to using visualisation strategies. This would then lead on to a simple written form of division based on early times table facts.</p> <p>(2x 5x 10x)</p>	<p>Concrete things if still required</p> <p>hoops for sharing</p> <p>whiteboards</p> <p>cubes</p> <p>arrays</p> <p>bags/sets</p> <p>number lines</p> <p>whiteboards</p>

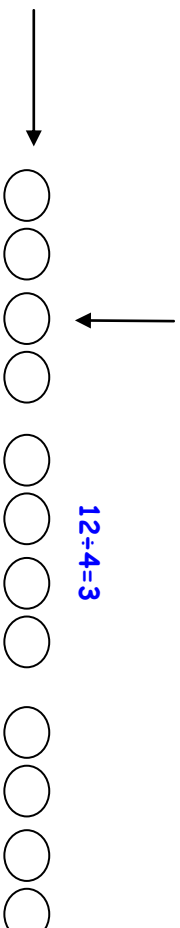
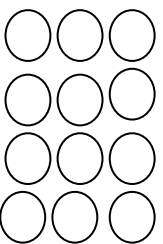
Stage Four – Consolidating Division Methods and Remainders.

Steps to Success	Vocabulary Key Questions	How it will look?	What can you do?	What can you use?
<p>I can solve division calculations with remainders.</p>	<p>Share, share equally, 1 each, 2 each....,group in pairs, 3's, 10's, equal groups of, divide, divided by, divided into, left, left over, how many...?, group, set remainders</p>	<p>At this stage children will still be consolidating their understanding of division as sharing and grouping and solving division problems using marked and empty number lines.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>1 group</p>  </div> <div style="text-align: center;"> <p>2 groups</p>  </div> <div style="text-align: center;"> <p>3 groups</p>  </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start; margin-top: 20px;"> <div style="text-align: center;"> <p>4 groups</p>  <p>20 ÷ 5 = 4</p> </div> <div style="text-align: center;"> <p>5 groups</p>  </div> </div> <div style="border: 1px solid black; padding: 10px; margin: 20px auto; width: fit-content;"> <p style="text-align: center;">Remainders</p> <p>Children are introduced to this through using numbers that do not divide exactly into given amounts e.g.</p> <p style="text-align: center;">$16 \div 3 = 5r1$</p> <p>Sharing - 16 shared between 3, how many left over? Grouping- How many 3's make 16, how many left over?</p> </div> <div style="text-align: center; margin-top: 20px;">  <p style="text-align: center;">0 5 10 15 20</p> </div> <p>Using a number line the children can see they are using repeated addition.</p> <div style="border: 1px solid black; padding: 10px; margin-top: 20px;"> <p>Next Steps—children will use known number facts, such as doubles, to help them with more challenging calculations.</p> <p>For example</p> <p style="text-align: center;"><i>'If I know $48 \div 4 = 12$...then I know $96 \div 4 = 24$...I will then know that $192 \div 4 = 48$'</i></p> </div>	<p>During this stage children will begin to make connections between division and repeated subtraction and division as the inverse to multiplication. They may still use pictorial representations but these will take the form of arrays. Many children will also experience remainders and whether to round up or down .</p>	<p>Arrays bags/sets number lines whiteboards</p>

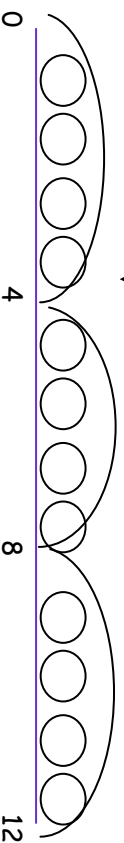
Progression in Division



Begin by looking at arrays
How many are there altogether?
How many are there in each row?
Create division number sentence— $12 \div 4 = 3$
The answer is how many rows you have got

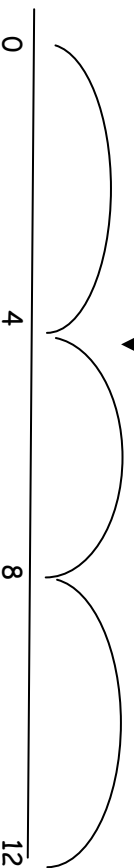


Change the array into a line on the interactive white board. They are put into groups of *the second number!* For example $15 \div 5 = 3$ *groups of 5, 20 \div 4 = 5* *groups of 4. Then count back in that number from the first number*



$12 \div 4 = 3$
Adding 4 repeatedly from 0 to get your answer

Children can do this using counters and a whiteboard initially. They collect the first number of counters. Then put them into groups of the second number along a number line which they have drawn on their white board. They then count the number of groups they have.



As above but without the counters—use the number line on the Interactive teaching programmes
What calculations can you see?—as above

REMAINDERS—Show children that sometimes you have some left out of the groups—these are remainders. Relate to real life problems. Children can be introduced to remainders early on in their learning of division.

Context of problems

Cuisenaire—How many 2 rods do you need to make a 10 rod?

Numicon—How many 2s make a 10?

Arrays—How many remainders are there when you create this array? $22 \div 5 =$

Real life problems—How many cherries will each child get? How many 5ps do I have if I have 50p?