

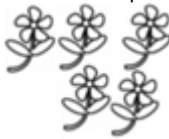
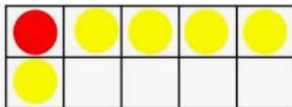



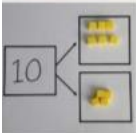

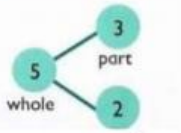
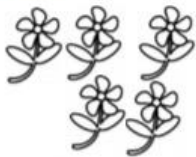
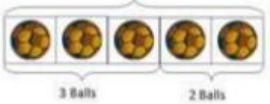


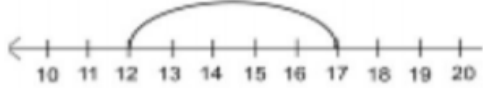



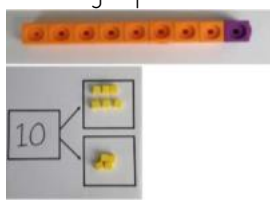
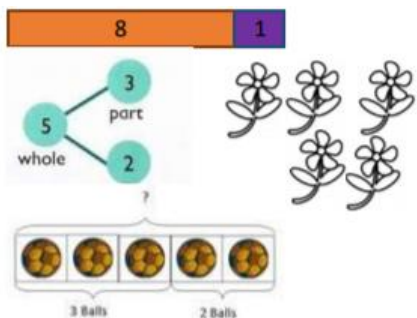


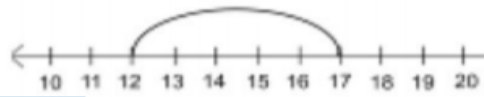
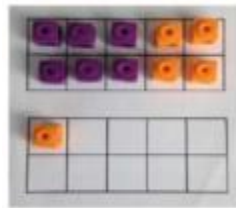
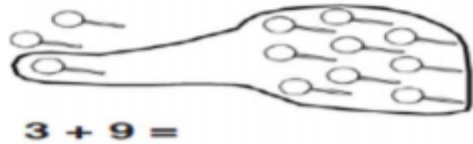
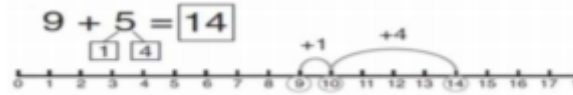

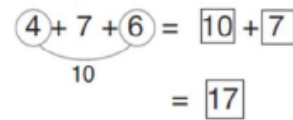
# Maths Calculation Policy

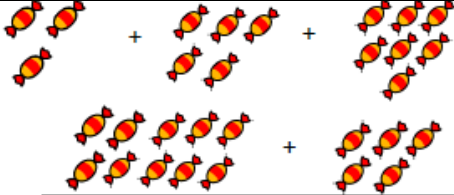

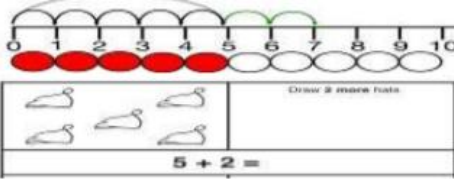
## Addition

### Reception


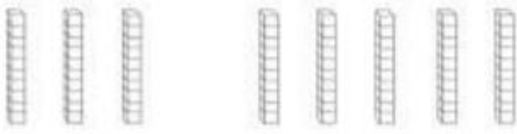
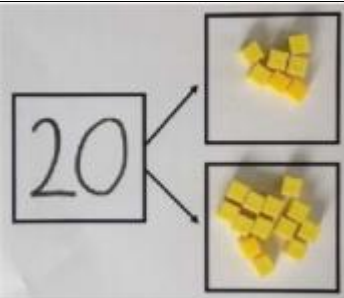


	Concrete	Pictorial	Abstract
Adding two groups together	<p>Use double sided counters and ten frames to add two numbers together.</p>  <p>Numicon used to explore what happens when you add two groups.</p> 	<p>Children draw pictures to help them solve addition problems</p> 	<p><math>3 + 4 = 7</math></p> <p>Children use ten frames/ numicon/ counters to find the answer to written calculations.</p>  <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <math>1 + 5 = 6</math> </div>
Combining two parts to make a whole: part-whole model	  <p>Use part, part whole model. Use cubes to add two numbers together as a group or in a bar.</p>  	<p>Use pictures to add two numbers together as a group or in a bar.</p>    	<p><math>8 = 5 + 3</math></p> <p><math>5 + 3 = 8</math></p>  <p>Use the part part whole diagram as shown above to move into the abstract. Include missing number questions to support varied fluency:</p> <p><math>8 = ? + 3</math></p> <p><math>5 + ? = 8</math></p>
Starting at the bigger number and counting on	 <p>Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.</p>	 <p><math>12 + 5 = 17</math> Start at the larger number on the number line and count on in ones or in one jump to find the answer.</p>	<p><math>5 + 12 = 17</math> Place the larger number in your head and count on the smaller number to find your answer.</p>

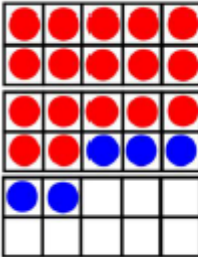
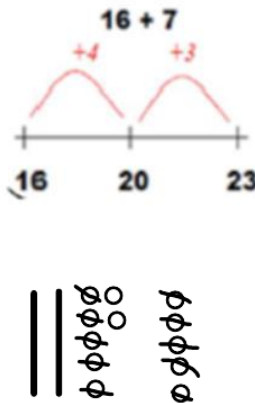

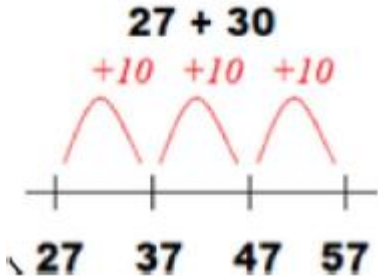

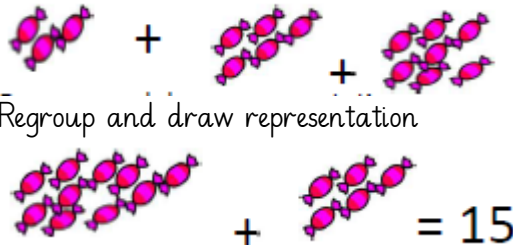
# Year One

	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part- whole model	 <p>Use part, part whole model. Use cubes to add two numbers together as a group or in a bar.</p> 	<p>Use pictures to add two numbers together as a group or in a bar.</p> 	$8 = 5 + 3$ $5 + 3 = 8$  <p>Use the part part whole diagram as shown above to move into the abstract. Include missing number questions to support varied fluency:</p> $8 = ? + 3$ $5 + ? = 8$
Starting at the bigger number and counting on	 <p>Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.</p>	 <p><math>12 + 5 = 17</math> Start at the larger number on the number line and count on in ones or in one jump to find the answer.</p>	<p><math>5 + 12 = 17</math> Place the larger number in your head and count on the smaller number to find your answer.</p>
Regrouping to make 10.	 <p>Start with the bigger number and use the smaller number to make 10. Use ten frames.</p>	 <p>Use pictures or a number line. Regroup or partition the smaller number using the part, part whole model to make 10.</p> 	<p><math>7 + 4 = 11</math> If I am at seven, how many more do I need to make 10? How many more do I add on now?</p>
Adding three single digits	<p><b><math>4 + 7 + 6 = 17</math></b></p> <p>Put 4 and 6 together to make 10. Add on 7.</p> 		 <p>Combine the two numbers that make 10 and then add on the remainder.</p>

	Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.	 Add together three groups of objects. Draw a picture to recombine the groups to make 10.	
Represent & use number bonds and related subtraction facts within 20	 2 more than 5.		Include missing number questions: $8 = ? + 3$ $5 + ? = 8$ Emphasis should be on the language '1 more than 5 is equal to 6.' '2 more than 5 is 7.' '8 is 3 more than 5.'



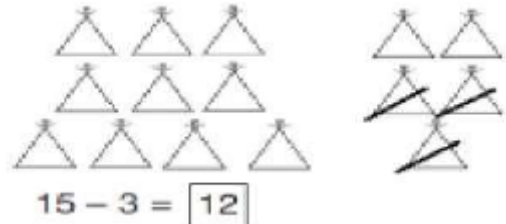


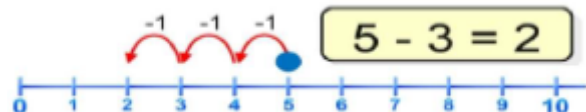
Year Two

Adding multiples of ten	<div>50= 30 + 20</div>  <p>Model using dienes and bead strings</p>	 <p>3 tens + 5 tens = _____ tens 30 + 50 = _____</p> <p>Use representations for base ten.</p>	<div>20 + 30 = 50</div> <div>70 = 50 + 20</div> <div>40 + □ = 60</div>				
Use known number facts Part, part whole	 <p>Children explore ways of making numbers within 20</p>	<div>20</div> <div>□</div> <div>□</div> <div>□ + □ = 20</div> <div>20 - □ = □</div> <div>□ + □ = 20</div> <div>20 - □ = □</div>	<p>Explore commutativity of addition by swapping the addends to build a fact family. Explore the concept of the inverse relationship of addition and subtractions and use this to check calculations.</p> <div>□ + 1 = 16</div> <div>16 - 1 = □</div> <div>1 + □ = 16</div> <div>16 - □ = 1</div>				
Using known facts	<div>□□ + □□ = □□□□</div> <div>□□□ + □□□ = □□□□□</div>	<div>•• + •• = •••</div> <div>     +      =      </div> <div>■ ■ + ■ ■ = ■ ■ ■</div> <p>Children draw representations of H,T and O</p>	<div>3 + 4 = 7</div> <p>leads to</p> <div>30 + 40 = 70</div> <p>leads to</p> <div>300 + 400 = 700</div>				
Bar model	 <div>3 + 4 = 7</div>	 <div>7 + 3 = 10</div>	<table><tr><td>23</td><td>25</td></tr><tr><td colspan="2">?</td></tr></table> <div>23 + 25 = 48</div>	23	25	?	
23	25						
?							

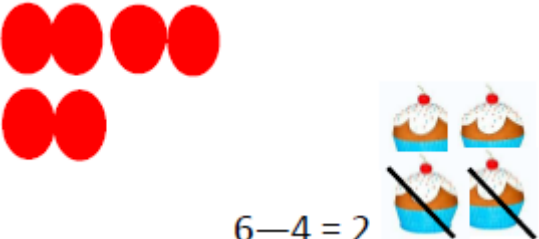
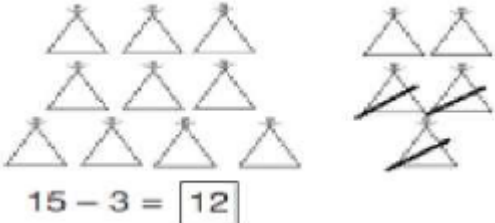


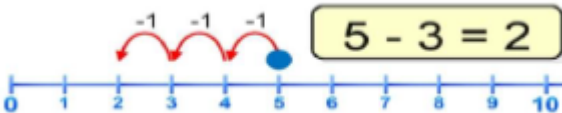
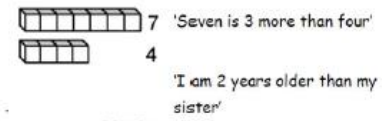
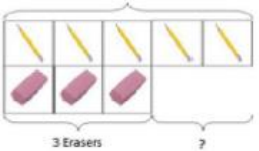
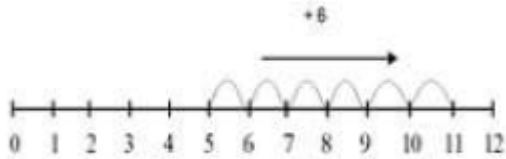
<p>Add a two digit number and ones</p>	<div><div><math>17 + 5 = 22</math></div><p>Use ten frame to make 'magic ten</p></div> <p>Children explore the pattern.</p> <div><math>17 + 5 = 22</math></div> <div><math>27 + 5 = 32</math></div>	<div><div><math>16 + 7</math></div></div> <p>Use part part whole and number line to model.</p>	<div><math>17 + 5 = 22</math></div> <p>Explore related facts</p> <div><math>17 + 5 = 22</math></div> <div><math>5 + 17 = 22</math></div> <div><math>22 - 17 = 5</math></div> <div><math>22 - 5 = 17</math></div> <div><table border="1"><tr><td colspan="2">2 2</td></tr><tr><td>17</td><td>5</td></tr></table></div> <p>Lead into recording in column format, to reinforce place value and prepare children for formal written methods with larger values</p>	2 2		17	5
2 2							
17	5						
<p>Add a 2 digit number and tens</p>	<div><div><math>25 + 10 = 35</math></div><p>Explore that the ones digit does not change</p></div>	<div><div><math>27 + 30</math></div></div>	<div><math>27 + 10 = 37</math></div> <div><math>27 + 20 = 47</math></div> <div><math>27 + \square = 57</math></div>				
<p>Add three 1-digit numbers</p>	<div><div>Combine to make 10 first if possible, or bridge 10 then add third digit</div></div>	<div><div>Regroup and draw representation</div><div><math>= 15</math></div></div>	<div><math>(4 + 7 + 6) = 10 + 7</math></div> <div><math>= 17</math></div> <p>Combine the two numbers that make/ bridge ten then add on the third.</p>				

# Subtraction

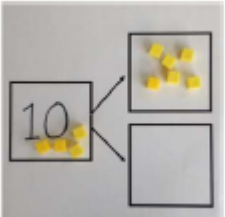
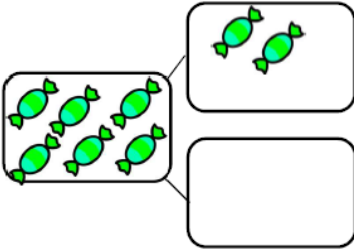
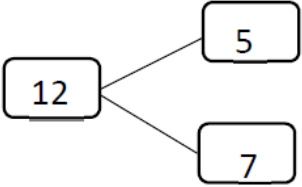

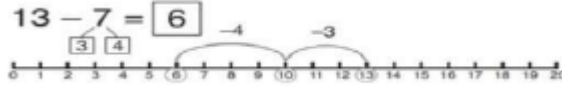



## Reception

	Concrete	Pictorial	Abstract
Taking away ones.	<p>Use physical objects, counters, cubes etc to show how objects can be taken away.</p> <p><math>4 - 2 = 2</math></p>   <p><math>6 - 4 = 2</math></p>	<p>Cross out drawn objects to show what has been taken away.</p> 	<p><math>7 - 4 = 3</math>  <math>16 - 9 = 7</math></p>
Counting back	 <p>Move objects away from the group, counting backwards.</p>  <p>Move the beads along the bead string as you count backwards.</p>	 <p>Count back in ones using a number line.</p>	<p>Put 13 in your head, count back 4.          What number are you at?</p>

# Year One

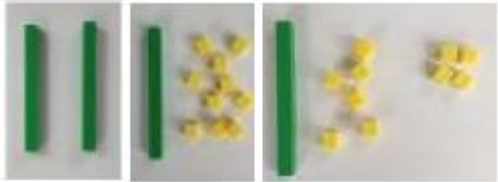
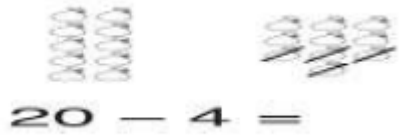


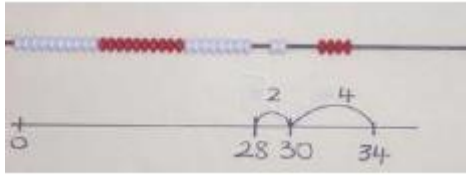
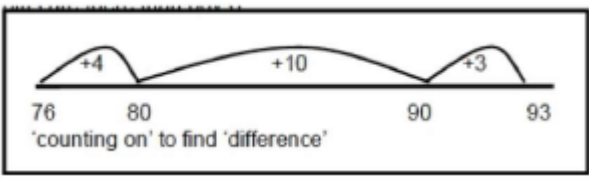
	Concrete	Pictorial	Abstract
Taking away ones.	<p>Use physical objects, counters, cubes etc to show how objects can be taken away.</p> $4 - 2 = 2$  $6 - 4 = 2$	<p>Cross out drawn objects to show what has been taken away.</p>  $15 - 3 = 12$	$7 - 4 = 3$ $16 - 9 = 7$
Counting back	 <p>Move objects away from the group, counting backwards.</p>  <p>Move the beads along the bead string as you count backwards.</p>	 $5 - 3 = 2$ <p>Count back in ones using a number line.</p>	<p>Put 13 in your head, count back 4. What number are you at?</p>
Find the Difference	<p>Compare objects and amounts</p>  <p>5 Pencils</p>  <p>3 Erasers ?</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 5. How many more does Hannah have than her sister?</p>




<p>Represent and use number bonds and related subtraction facts within 20</p> <p>Include subtracting zero</p> <p>Part Part Whole Model</p>	 <p>Link to addition. Use PPW model to model the inverse.</p> <p>If 10 is the whole and 6 is one of the parts, what's the other part? <math>10 - 6 = 4</math></p>	 <p>Use pictorial representations to show the part.</p>	<p>Move to using numbers within the part whole model.</p>  <p>Include missing number problems:  <math>12 - ? = 5</math>  <math>7 = 12 - ?</math></p>
<p>Make 10</p>	<p>14—9</p>  <p>Make 14 on the ten frame. Take 4 away to make ten, then take one more away so that you have taken 5.</p>	<p><math>13 - 7 = 6</math></p>  <p>Jump back 3 first, then another 4. Use ten as the stopping point.</p>	<p>16—8</p> <p>How many do we take off first to get to 10?</p> <p>How many left to take off?</p>
<p>Bar model</p> <p>Including the inverse operations.</p>	 <p><math>5 - 2 = 3</math></p>		 <p> <math>10 = 8 + 2</math>  <math>10 = 2 + 8</math>  <math>10 - 2 = 8</math>  <math>10 - 8 = 2</math> </p>



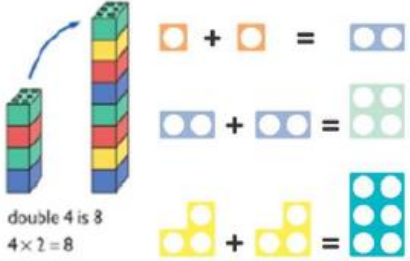

Year Two

	Concrete	Pictorial	Abstract
Regroup a ten into ten ones	<div></div> <p>Use a PV chart to show how to change a ten into ten ones, use the term 'take and make'</p>	<div></div>	<div><math>20 - 4 = 16</math></div>
Partitioning to subtract without regrouping.	<div><math>34 - 13 = 21</math></div> <div></div> <p>Use Dienes to show how to partition the number when subtracting without regrouping.</p>	<div>Children draw representations of Dienes and cross off.</div> <div></div> <div><math>43 - 21 = 22</math></div>	<div><math>43 - 21 = 22</math></div>
Make ten strategy Progression should be crossing one ten, crossing more than one ten, crossing the hundreds.	<div></div> <div><math>34 - 28</math></div> <p>Use a bead bar or bead strings to model counting to next ten and the rest.</p>	<div></div> <p>Use a number line to count on to next ten and then the rest.</p> <div><div><div>93</div><div>903</div></div><div><div>8013</div><div>- 706</div><div>107</div></div></div>	<div><math>93 - 76 = 17</math></div>

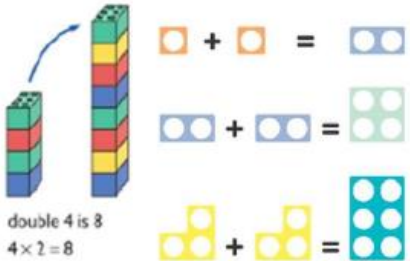

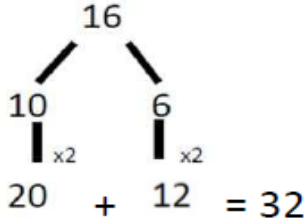
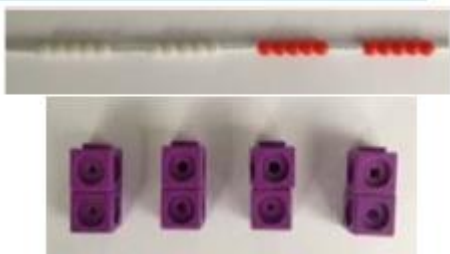
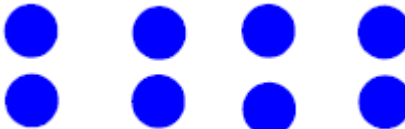
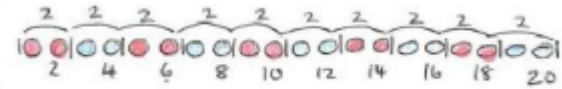



Subtract with regrouping	$33 - 15 =$ Base 10 with exchange 	$33-15 =$ Draw base 10 with exchange	$33-15 = 18$
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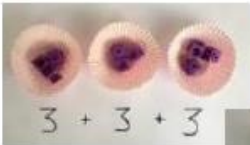





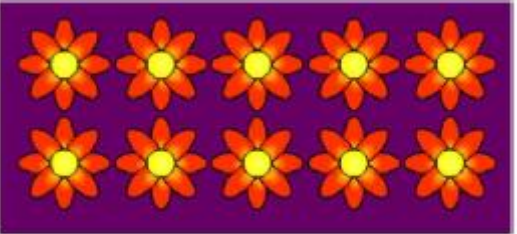
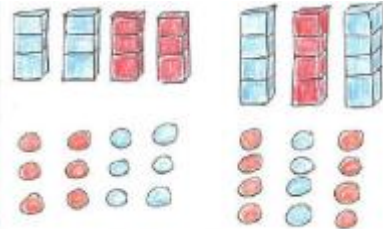
# Multiplication

## Reception

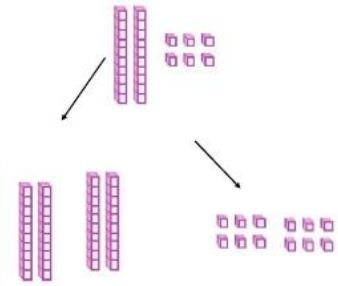
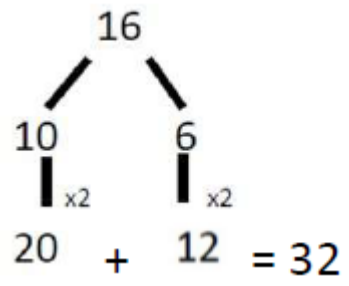
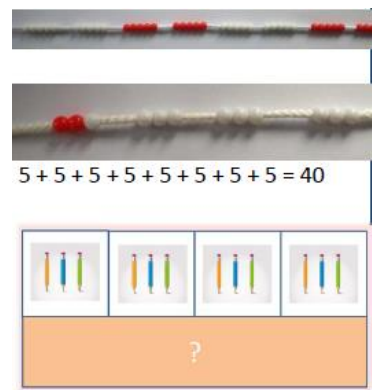
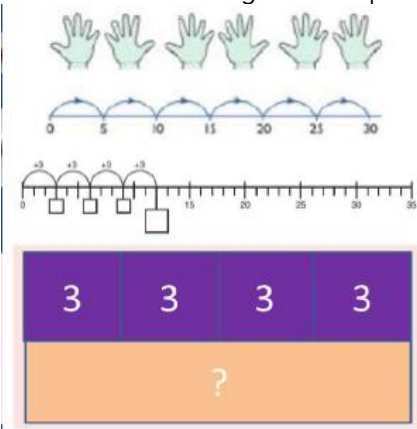

	Concrete	Pictorial	Abstract
Doubling	<p>Use practical activities using manipulatives including cubes and Numicon to demonstrate doubling</p> 	<p>Draw pictures to show how to double numbers</p> <p>Double 4 is 8</p> 	

## Year One

	Concrete	Pictorial	Abstract
Doubling	<p>Use practical activities using manipulatives including cubes and Numicon to demonstrate doubling</p>  <p>double 4 is 8 <math>4 \times 2 = 8</math></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>  <p><math>16</math> <math>10 \times 2 = 20</math> <math>6 \times 2 = 12</math> <math>20 + 12 = 32</math></p>
Counting in multiples (2s, 5s, 10s)	<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. 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	  <p><math>\square \times \square = 8</math></p> <p>Use manipulatives to create equal groups.</p>	<p>Draw  to show <math>2 \times 3 = 6</math></p> <p>Draw and make representations</p>	<p><math>2 \times 4 = 8</math></p>

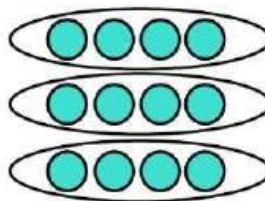
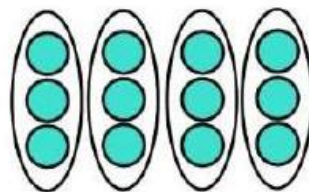
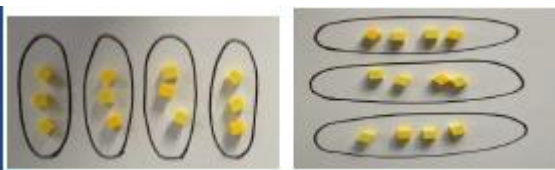
Repeated addition	   <p>Use different objects to add equal groups</p>	<p>Use pictorial including number lines to solve problems.</p> <p>There are 3 sweets in one bag. How many are there in 5 bags?</p>  	<p>Write addition sentences to describe objects and pictures.</p> 
Understanding arrays	<p>Use objects 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> 	$3 \times 2 = 6$ $2 \times 5 = 10$

## Year Two

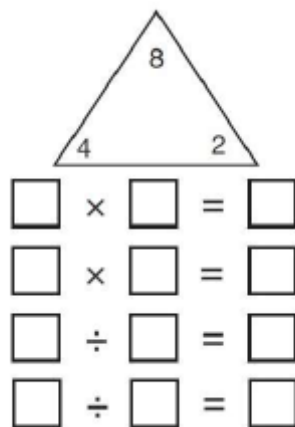
	Concrete	Pictorial	Abstract
Doubling	<p>Model doubling using dienes and PV counters.</p>  $40 + 12 = 52$	<p>Draw pictures and representations to show how to double numbers</p>	<p>Partition a number and then double each part before recombining it back together.</p>  $20 + 12 = 32$
Counting in multiples of 2, 3, 4, 5, 10 from 0 (repeated addition)	<p>Count the groups as children are skip counting, children may use their fingers as they are skip counting. Use bar models.</p>  $5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40$	<p>Number lines, counting sticks and bar models should be used to show representation of counting in multiples.</p> 	<p>Count in multiples of a number aloud. Write sequences with multiples of numbers.  0, 2, 4, 6, 8, 10  0, 3, 6, 9, 12, 15  0, 5, 10, 15, 20, 25, 30</p> $4 \times 3 = \square$
Multiplication is commutative	<p>Create arrays using counters and cubes and Numicon.</p> 	<p>Use representations of arrays to show different calculations and explore commutativity.</p>	$12 = 3 \times 4 \quad 12 = 4 \times 3$



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.



Using the Inverse  
This should be taught alongside division, so pupils learn how they work alongside each other.



$$2 \times 4 = 8$$

$$4 \times 2 = 8$$

$$8 \div 2 = 4$$

$$8 \div 4 = 2$$

$$8 = 2 \times 4$$

$$8 = 4 \times 2$$

$$2 = 8 \div 4$$

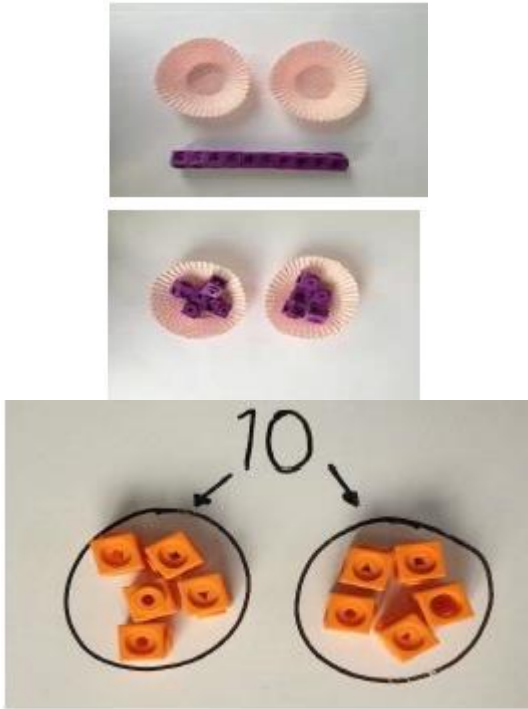

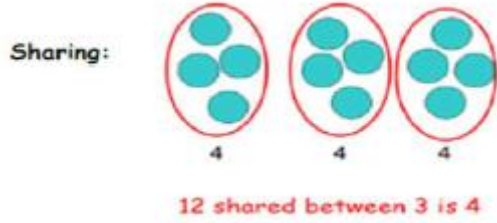
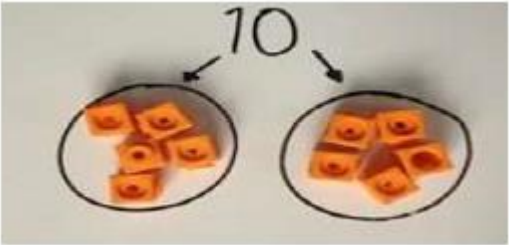
$$4 = 8 \div 2$$

Show all 8 related fact family sentences.



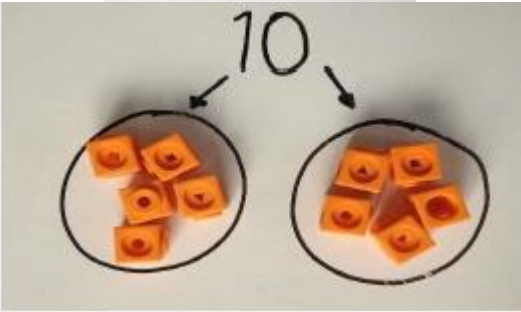

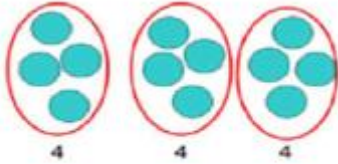
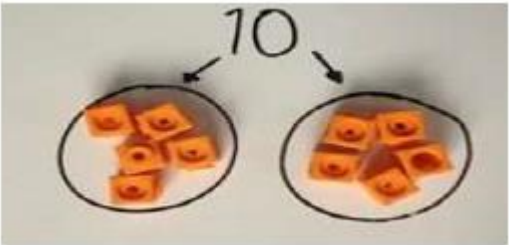




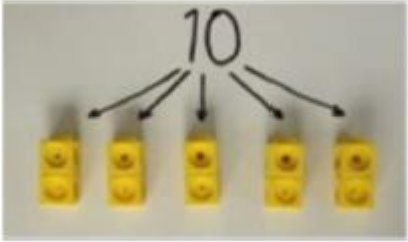

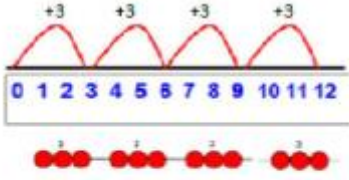
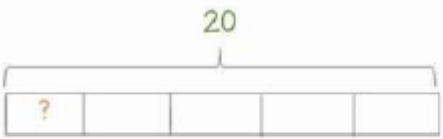
# Division

## Reception

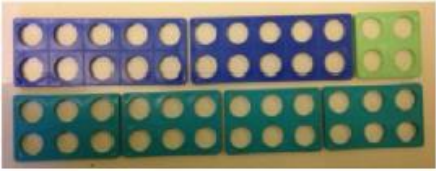
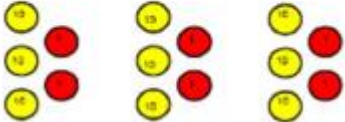
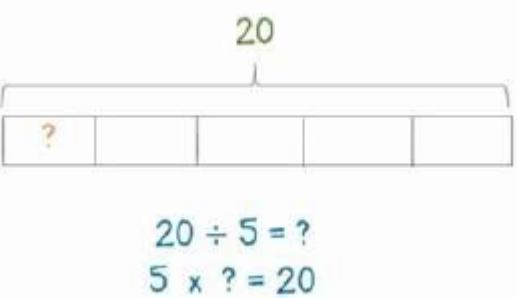

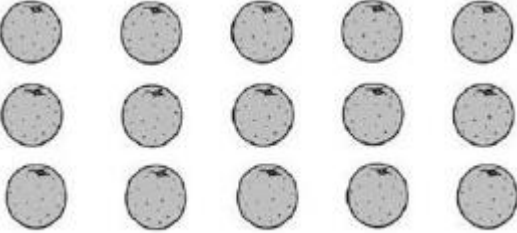
	Concrete	Pictorial	Abstract
Division as sharing	 <p>I have 10 cubes, can you share them equally in 2 groups?</p>	<p>Children use pictures or shapes to share quantities.</p>  <p>8 shared between 2 is 4</p>  <p>Sharing: 12 shared between 3 is 4</p>	<p>12 shared between 3 is 4</p>
Division as sharing	 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

Year One

	Concrete	Pictorial	Abstract
Division as sharing	<div>  </div> <p>I have 10 cubes, can you share them equally in 2 groups?</p>	<p>Children use pictures or shapes to share quantities.</p> <div> 8 shared between 2 is 4</div> <div><p>Sharing:</p> 12 shared between 3 is 4</div>	<p>12 shared between 3 is 4</p>
Division as sharing	<div></div> <p>I have 10 cubes, can you share them equally in 2 groups?</p>	<p>Children use pictures or shapes to share quantities.</p> <div> <div>8 ÷ 2 = 4</div></div> <p>Children use bar modelling to show and support understanding.</p>	<p>12 ÷ 3 = 4</p>

		 $12 \div 4 = 3$	
Division as grouping	<p>Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.</p>  	<p>Use number lines for grouping</p>  $12 \div 3 = 4$ <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>  $20 \div 5 = ?$ $5 \times ? = 20$	$28 \div 7 = 4$ <p>Divide 28 into 7 groups. How many are in each group?</p>

## Year Two

	Concrete	Pictorial	Abstract
Division as grouping	<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>  $20 \div 5 = ?$ $5 \times ? = 20$	<p>How many groups of 6 in 24?</p> $24 \div 6 = 4$
Division with arrays	 <p>Link division to multiplication by creating an array and thinking about the number sentences that can be created.</p> <p>Eg <math>15 \div 3 = 5</math> <math>5 \times 3 = 15</math>  <math>15 \div 5 = 3</math> <math>3 \times 5 = 15</math></p>	<p>Draw an array and use lines to split the array into groups to make multiplication and division sentences.</p> 	<p>Find the inverse of multiplication and division sentences by creating eight linking number sentences.</p> $7 \times 4 = 28$ $4 \times 7 = 28$ $28 \div 7 = 4$ $28 \div 4 = 7$ $28 = 7 \times 4$ $28 = 4 \times 7$ $4 = 28 \div 7$ $7 = 28 \div 4$