
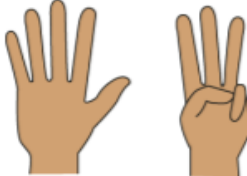



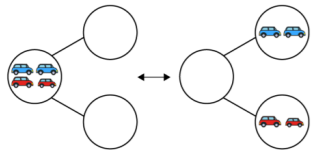
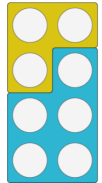
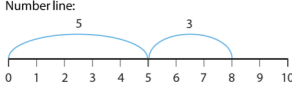

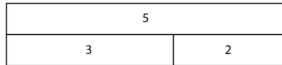
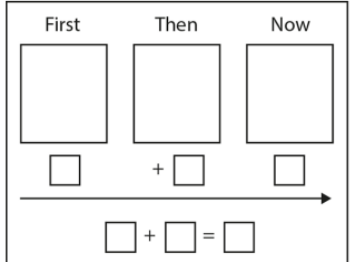
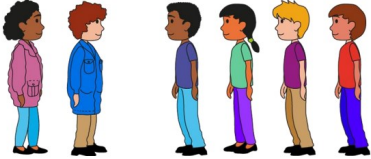
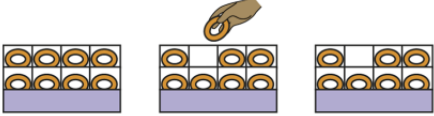

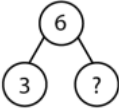

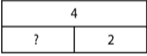
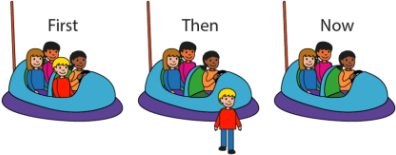
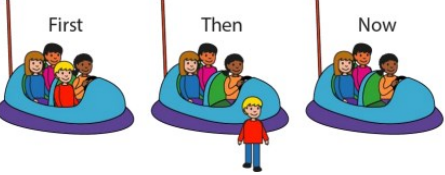
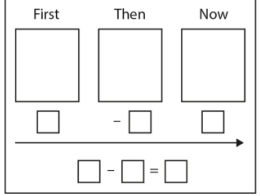




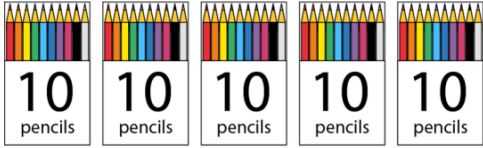
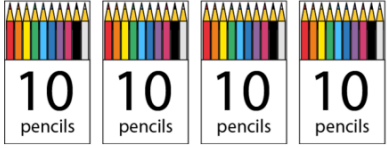


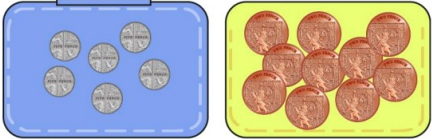
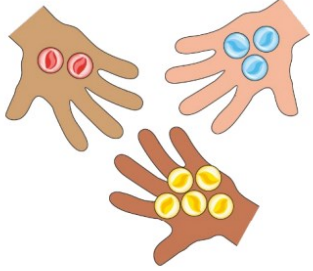

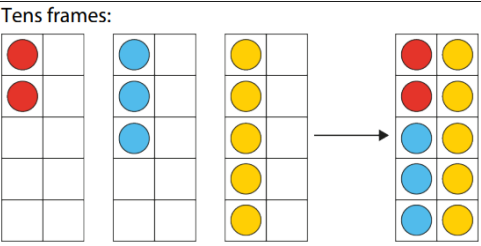
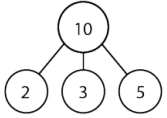

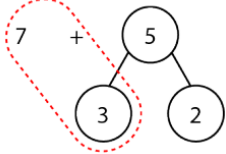
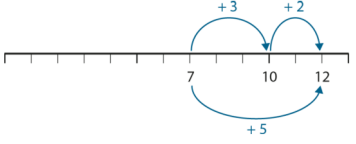
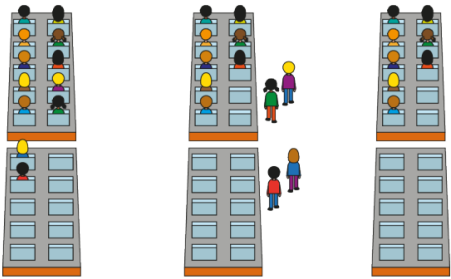
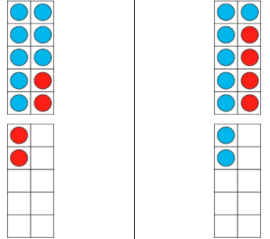
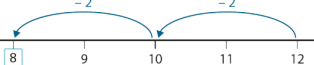
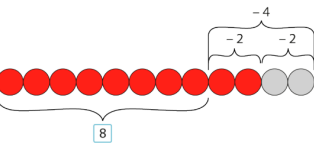


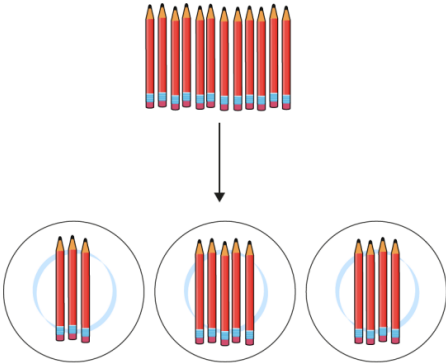



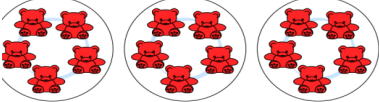



Addition	Concrete	Pictorial	Abstract
<p>Year 1</p> <p>Introducing part, part whole in addition.</p>	 <p>• 'There are four cars. Two of them are blue and two of them are red.'</p>  <p>First  Then  Now </p>	     <p>Counters and tens frames:</p> <p>• 'Four is one less than five.' • 'Five is one more than four.'</p> <p>Cherry representation:</p> <p>Bar model:</p>	$2 + 4 = 6$ $4 + 2 = 6$ $2 + 4 = 4 + 2$
<p>Stem sentences and vocabulary</p>	<p>_____ is the whole; is a _____ is a part</p> <p>_____ is 5 and more</p> <p>Demonstrate this in the classroom.</p> <p>First, four children were sitting on the bus. Then, three more children got on the bus. Now, seven children are sitting on the bus.'</p>	<p>'first..., then..., now...'</p> 	<p>'There are... and...' 'We can write this as ___ plus ___.' 'The ___ represents the...' 'The ___ represents the...'</p> <p>'___ is equal to ___ plus ___.' '___ plus ___ is equal to ___.' '___ and ___ are the addends.' '___ is the sum.'</p>

Subtraction	Concrete	Pictorial	Abstract
<p data-bbox="123 228 369 268">Subtraction</p>	<p data-bbox="450 231 813 272"><i>'There are six children. Two of them have put their coats on. How many have not put their coats on?'</i></p>  <p data-bbox="450 475 936 612"><i>'The 6 represents all of the children.'</i> <i>'The minus 2 represents the children who have put their coats on.'</i> <i>'The 4 represents the children who have not put their coats on.'</i></p>	<p data-bbox="974 236 1397 309">Reduction context – pictorial representation: <i>'First there were eight doughnuts. Then one was eaten. Now there are seven doughnuts.'</i></p> <p data-bbox="1025 316 1375 336">First Then Now</p>  <p data-bbox="1037 475 1361 496">8 - 1 7</p>    	<p data-bbox="1534 272 1653 300">$8 - 1 = 7$</p>  <p data-bbox="1534 539 1832 560">4 - 1 3</p> <p data-bbox="1653 579 1720 600">$4 - 1 = 3$</p>
<p data-bbox="123 691 421 767">Stem sentences and vocabulary</p>	<p data-bbox="481 699 837 772">Demonstrate this in the classroom.</p> <p data-bbox="450 839 922 927">First, there were five children in the book corner. Then, two children left the book corner. Now there are three children in the book corner.'</p>	 	

Year 1	Concrete	Pictorial	Abstract				
<p>Multiplication</p> <p>Counting, unitising and coins</p>	<p>Pre-money tokens: 'How many dots are there? Count in groups of two.'</p>   <p>Pre-money tokens: 'How many dots are there? Count in groups of ten.'</p>  	<p>'How many pencils are there? Count in groups of ten.'</p>  	<p>The one-penny coin:</p>   <p>Buying goods:</p> <table border="1" data-bbox="1507 592 1865 703"> <tr> <td>Pencil 6p</td> <td>Marble 4p</td> <td>Mini spinning top 9p</td> <td>Eraser 10p</td> </tr> </table> <p>'How many pennies do you need to buy:</p> <ul style="list-style-type: none"> • one marble? • one eraser? • one spinning top? • one pencil? <p>'Which purse would you rather have?'</p>  <p>A B</p>	Pencil 6p	Marble 4p	Mini spinning top 9p	Eraser 10p
Pencil 6p	Marble 4p	Mini spinning top 9p	Eraser 10p				
<p>Stem sentences and vocabulary</p>	<p>'This is a ___-pence coin. It has a value of ___ p.'</p> <p>'There are ___ coins.'</p> <p>'Each coin has a value of ___ p.'</p> <p>'This is ___ p.'</p>	<p>'I say two pence, but I think two one-pennies.'</p> <p>'I say five pence, but I think five one-pennies.'</p> <p>'I say ten pence, but I think ten one-pennies.'</p>	<p>'The ___ costs ___ p.'</p> <p>'Each coin has a value of ___ p.'</p> <p>'The ___ costs ___ p.'</p> <p>'Each coin has a value of ___ p.'</p> <p>'So I need ___ coins.'</p>				

Addition	Concrete	Pictorial	Abstract
<p>Year 2</p>	<p><i>'Madison has two red marbles, Charlie has three blue marbles and Asif has five yellow marbles. They have ten marbles altogether.'</i></p>  <p>Children can use real marbles as manipulatives.</p> <p>Practical: First, four children were sitting on the bus. Then, three more children got on the bus, and then two more children got on. Now, nine children are sitting on the bus.'</p> <p>Chairs could be arranged to support acting out this story.</p> <p><i>'I have three apples, two bananas and four oranges. How many pieces of fruit do I have?'</i></p>  $\begin{array}{r} 3 \\ + \\ 5 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ + \\ 4 \\ \hline \end{array}$	<p>Tens frames:</p>  <p>Part-part-part-whole representation:</p>  <p>First Then Then Now</p>   	$10 = 2 + 3 + 5$ $2 + 3 + 5 = 10$ $7 + 5 = 7 + 3 + \square$ $8 + 5 = 8 + 2 + \square$ $6 + 5 = 6 + \square + \square$ $8 + \square > 10 + 5$
<p>Stem sentences and vocabulary</p>	<p>'First I partition the ___: ___ plus ___ is equal to ___' '</p> <p>Then ___ plus ___ is equal to ten...'</p> <p>'...and ten plus ___ is equal to ___.' 'We can look for pairs of addends which sum to 10.'</p> <p>'___ plus ___ is equal to ten, then ten plus ___ is equal to ___.'</p>		

Year 2 Subtraction	Concrete	Pictorial	Abstract						
	<p>Practise telling the story as a class until children are confident describing it:</p> <p><i>'First there were twelve children on the ride. Then four got off. Now there are eight children on the ride.'</i></p>	<p><i>'First there were twelve children on the ride. Then four got off. Now there are eight children on the ride.'</i></p> <p>First Then Now</p>  <p>Subtraction through ten: Subtraction from ten:</p>   	$\begin{array}{r} 12 \\ - 4 \\ \hline 2 \quad 2 \end{array}$ <p>$12 - 2 = 10$ $10 - 2 = 8$ so $12 - 4 = 8$</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;"> $\begin{array}{r} 12 \\ - 4 \\ \hline 2 \quad 2 \end{array}$ </td> <td style="width: 50%; text-align: center;"> $\begin{array}{r} 12 \\ - 4 \\ \hline 10 \quad 2 \end{array}$ </td> </tr> <tr> <td style="text-align: center;"> $12 - 2 = 10$ $10 - 2 = 8$ so $12 - 4 = 8$ </td> <td style="text-align: center;"> $10 - 4 = 6$ $6 + 2 = 8$ so $12 - 4 = 8$ </td> </tr> </table> <table style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;"> $\begin{array}{r} 12 \\ - 3 \\ \hline 2 \quad 1 \end{array}$ </td> <td style="width: 50%; text-align: center;"> $12 - 2 = 10$ $10 - 1 = 9$ so $12 - 3 = 9$ </td> </tr> </table>	$\begin{array}{r} 12 \\ - 4 \\ \hline 2 \quad 2 \end{array}$	$\begin{array}{r} 12 \\ - 4 \\ \hline 10 \quad 2 \end{array}$	$12 - 2 = 10$ $10 - 2 = 8$ so $12 - 4 = 8$	$10 - 4 = 6$ $6 + 2 = 8$ so $12 - 4 = 8$	$\begin{array}{r} 12 \\ - 3 \\ \hline 2 \quad 1 \end{array}$	$12 - 2 = 10$ $10 - 1 = 9$ so $12 - 3 = 9$
$\begin{array}{r} 12 \\ - 4 \\ \hline 2 \quad 2 \end{array}$	$\begin{array}{r} 12 \\ - 4 \\ \hline 10 \quad 2 \end{array}$								
$12 - 2 = 10$ $10 - 2 = 8$ so $12 - 4 = 8$	$10 - 4 = 6$ $6 + 2 = 8$ so $12 - 4 = 8$								
$\begin{array}{r} 12 \\ - 3 \\ \hline 2 \quad 1 \end{array}$	$12 - 2 = 10$ $10 - 1 = 9$ so $12 - 3 = 9$								
Stem sentences and vocabulary	<p>We are going to partition the four into two and two.'</p> <p>'We first subtract two from twelve to get to ten.'</p> <p>'Then we subtract the remaining two from the ten - we already know that ten minus two is equal to eight.'</p>								

Year 2	Concrete	Pictorial	Abstract																																					
<p>Multiplication</p>	<p>Grouping objects – example 1: ‘There are some pencils.’</p>  <p>‘The pencils have been grouped.’</p> 	 <ul style="list-style-type: none"> • There are ___ equal groups of eggs. • There are ___ eggs in each group. • There are ___ groups of _____. <p>‘Look at the representations below.’</p> <ul style="list-style-type: none"> • ‘What’s the same?’ • ‘What’s different?’   <table border="1" data-bbox="967 673 1344 711"> <tr> <td>5</td> <td>5</td> <td>5</td> </tr> </table>  <p>‘Tick the picture that matches the expression.’</p> <p>$5 + 5 + 5$</p>  	5	5	5	<table border="1" data-bbox="1447 213 1886 261"> <tr> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> </table> <p>$2 + 2 + 2 + 2$</p> <table border="1" data-bbox="1496 347 1872 580"> <tr> <td>4</td> <td>1×4</td> </tr> <tr> <td>$4 + 4$</td> <td>2×4</td> </tr> <tr> <td></td> <td>3×4</td> </tr> <tr> <td>$4 + 4 + 4 + 4$</td> <td></td> </tr> <tr> <td></td> <td>5×4</td> </tr> </table> <table border="1" data-bbox="1473 596 1859 679"> <tr> <td>3</td> <td>\times</td> <td>2</td> <td>=</td> <td>6</td> </tr> <tr> <td>factor</td> <td>\times</td> <td>factor</td> <td>=</td> <td>product</td> </tr> </table> <table border="1" data-bbox="1473 711 1859 794"> <tr> <td>6</td> <td>=</td> <td>3</td> <td>\times</td> <td>2</td> </tr> <tr> <td>product</td> <td>=</td> <td>factor</td> <td>\times</td> <td>factor</td> </tr> </table> <p>$7 \times 2 = 8 \times 2 - 2$</p> <p>$7 \times 2 \bigcirc 6 \times 2 - 2$</p>	2	2	2	2	4	1×4	$4 + 4$	2×4		3×4	$4 + 4 + 4 + 4$			5×4	3	\times	2	=	6	factor	\times	factor	=	product	6	=	3	\times	2	product	=	factor	\times	factor
5	5	5																																						
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product	=	factor	\times	factor																																				
<p>Stem sentences and vocabulary</p>	<p>‘The groups are <u>equal</u> because there are <u>the same number of</u> ___ in each group.’</p> <p>‘The groups are <u>unequal</u> because there are <u>a different number of</u> ___ in each group.’</p> <p>‘Factor times factor is equal to the product.’</p> <p>‘The product is equal to factor times factor.’</p>	<p>‘There are ___ and ___ and ___ and...’</p> <p>‘We can write this as ___ plus ___ plus ___ plus...’</p>	<p>‘There are ___ equal groups of ___.’</p> <p>‘There are ___ in each group.’</p> <p>‘There are ___ groups of ___.’</p> <p>‘Use cubes to show me <u>four plus four plus four</u>.’</p> <p>$4 + 4 + 4$</p> <p>‘I have some groups of apples...’</p> <p>$3 + 3 + 3 + 3 + 3 + 3$</p> <p>‘Draw a picture to show the apples.’</p>																																					

Year 2

Pictorial

Abstract

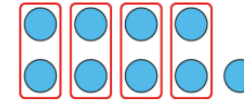
Division

6		
2	2	2

• 'There are fifteen biscuits. If I put them into bags of five, how many bags will I need?'

'A farmer has forty eggs. She can fit ten eggs in a box. How many boxes does she need?'

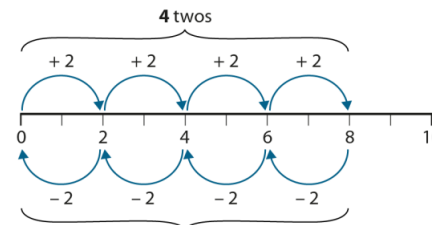
Describing remainders – example 1:



$$9 = 2 + 2 + 2 + 2 + 1$$

$$9 = 4 \times 2 + 1$$

$$2 + 2 + 2 + 2 = 8$$



$$8 - 2 - 2 - 2 - 2 = 0$$

30	÷	5	=	6
dividend	÷	divisor	=	quotient

$$4 \times 10 = 40$$

so

$$40 \div 10 = 4$$

$$\square \times 2 = \square$$

so

$$12 \div 2 = \square$$

' ___ is divided into groups of ___.
 There are ___ groups.'
 ' ___ is divided into ___ groups of ___.'

' ___ is the dividend.'
 ' ___ is the divisor.'
 ' ___ is the quotient.'