

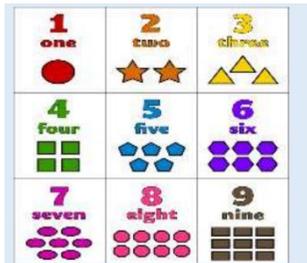
Calculation Policy

EYFS Addition

Early learning goals:

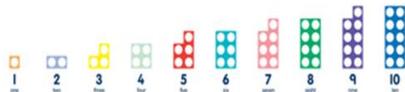
- Count reliably with numbers from 1 to 20, place them in order.
- Say which number is one more than a given number.
- Using quantities and objects, they add two single-digit numbers and count on to find the answer.

Recognise numbers up to 20 and understand the meaning of each number by recognising and knowing their clusters



Numicon shapes are introduced straight away and be used to:

- identify 1 more/less
- combine pieces to add
- find number bonds
- add without counting



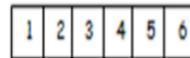
Count on in ones and say which number is one more than a given number using a number line or number track to 20.



Number tracks can be introduced to count up on

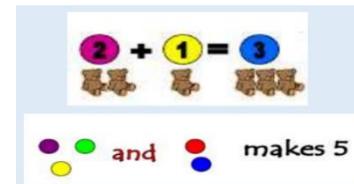
and to find one more:

What is 1 more than 4?



1 more than 13?

Begin to relate addition to combining two groups of objects using practical resources, role play, stories and songs.



Children can begin to combine groups of objects using concrete apparatus:



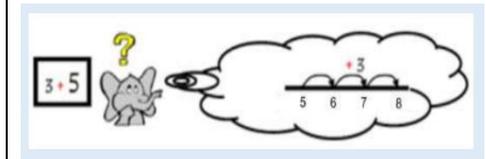
Construct number sentences verbally or using cards to go with practical activities.

Children are encouraged to read number sentences aloud in different ways:

- “Three add two equals 5”
- “5 is equal to three and two”
- “5 is the same as three and two”

Children make a record in pictures, words or symbols of addition activities.

Know that counting on is a strategy for addition. Use numbered number lines to 20.



Calculation Policy

EYFS Subtraction

Early learning goals:

- Say which number is one less than a given number.
- Using quantities and objects, they subtract two single-digit numbers and count back to find the answer.

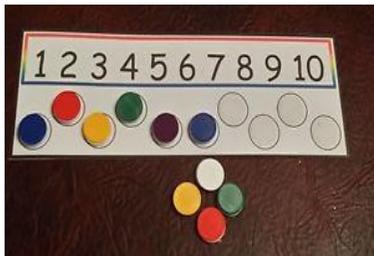
Say which number is one less than a given number using a number line or number track to 20.

Begin to count backwards in familiar contexts such as number rhymes or stories.

Begin to relate subtraction to 'taking away' using concrete objects and role play.

Count backwards along a number line to 'take away'

Number tracks can be introduced to count back and to find one less:
What is 1 less than 9?
1 less than 20?



Children make a record in pictures, words or symbols of subtraction activities.



Concrete apparatus is used to relate subtraction to taking away and counting how many objects are left.
Concrete apparatus models the subtraction of 2 objects from a set of 5.

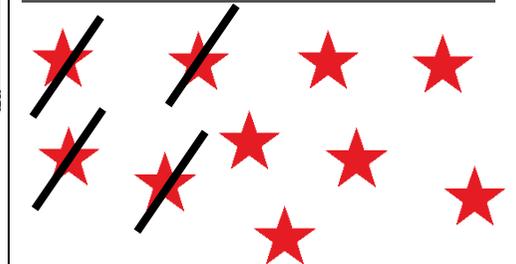
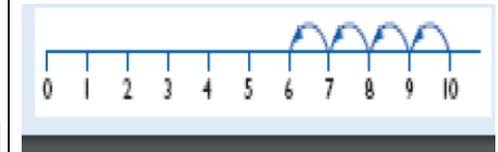


Construct number sentences verbally or using cards to go with practical activities.



Children are encouraged to read sentences aloud in different ways "five subtract one leaves four" "four is equal to five subtract one" "four is the same as five subtract one"

Solve simple problems using fingers



Calculation Policy

EYFS Multiplication and Division

Early learning goals:

- They solve problems, including doubling, halving and sharing
- They solve problems, including halving and sharing.

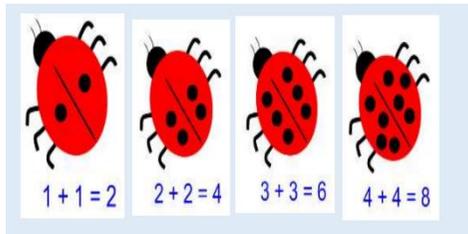
Use pictorial representations and concrete resources to double numbers to 10.

Use concrete sources, role play, stories and songs to begin counting in twos, fives and tens.

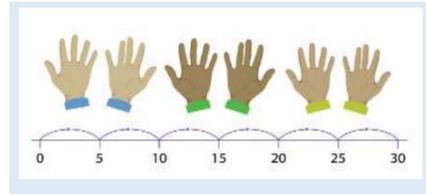
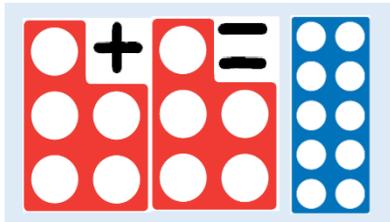
Use pictorial representations and concrete resources to halve numbers to 10.

Begin to share quantities using practical resources, role play, stories and songs.

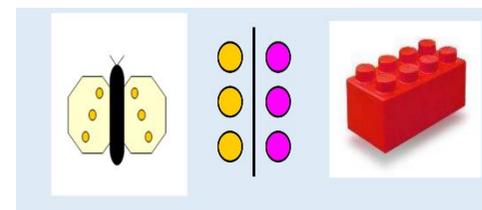
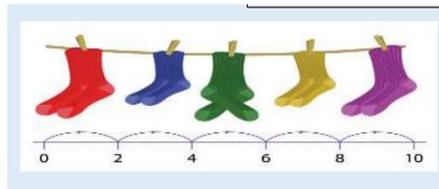
The link between addition and



multiplication can be introduced through doubling.



'I have 5 pairs of socks on this line. How many socks do I have altogether?'



"I have got a sandwich to share between two people. Can you cut the sandwich in half?"



Children have a go at recording the calculation that has been carried out: e.g. by drawing pictures in groups or by arranging concrete apparatus into groups.

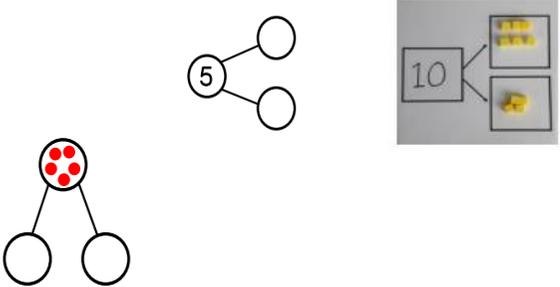
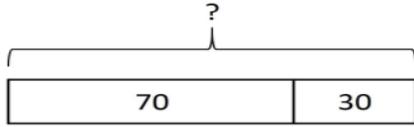
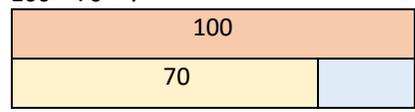


*Role play example:
It is the end of the party and the final two teddies are waiting for their party bags. Provide empty party bags and a small collection of items such as gifts, balloons and slices of cake. Ask the children to share the objects between the two bags.*

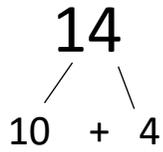
Sharing model:
I have 8 sweets. I want to share them with my friend. How many will we have each?



Key Stage 1 and 2

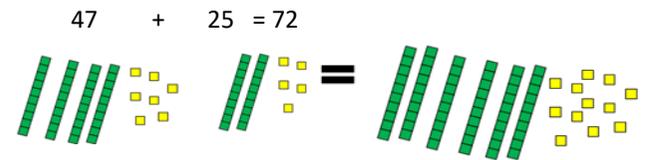
	Year 1	Year 2	Year 3									
Addition	<p>Pupils memorise and reason with number bonds to 10 and 20 in several forms.</p> <p>Complete the part whole models by drawing the counters then writing the numerals. Linking to bar modelling in Year 1.</p>  <p><u>+ = signs and missing numbers</u> Children need to understand the concept of equality before using the '=' sign. Calculations should be written either side of the equality sign so that the sign is not just interpreted as 'the answer'.</p> <p>$2 = 1 + 1$ $2 + 3 = 4 + 1$</p> <p>Missing numbers need to be placed in all possible places.</p> <p>$3 + 4 = \square$ $\square = 3 + 4$ $3 + \square = 7$ $7 = \square + 4$</p> <p><u>Counting and Combining sets of Objects</u> Combining two sets of objects (aggregation) which will progress onto adding on to a set (augmentation)</p>	<p>Practice addition to 20 and become increasing fluent in deriving facts.</p> <p>Methods taught in Year 1 should continue to be used to consolidate learning and understanding in Year 2.</p> <p>Use bar modelling to represent addition calculations.</p>  <p>$70 + 30 = 100$</p> <p>Missing number problems e.g $14 + 5 = 10 + \square$ $32 + \square + \square = 100$ $35 = 1 + \square + 5$</p> <p>$100 = 70 + ?$</p>  	<p>I can add and subtract numbers with up to three digits using formal written methods.</p> <p>Pupil needing to use number lines from Year 2 into 3 should continue to do so depending on their ability.</p> <p><u>Counting on in tens and ones</u> $23 + 12 = 23 + 10 + 2$ $= 33 + 2$ $= 35$</p> <p><u>Adding 9 or 11 by adding 10 and adjusting by 1</u> e.g. Add 9 by adding 10 and adjusting by 1 $35 + 9 = 44$</p> <table border="1" data-bbox="1512 901 1948 1045"> <tbody> <tr> <td>Starting Number</td> <td>+ 10</td> <td>+100</td> </tr> <tr> <td>97</td> <td>107</td> <td>197</td> </tr> <tr> <td>123</td> <td>133</td> <td>223</td> </tr> </tbody> </table> <p><u>Partition into tens and ones</u></p>	Starting Number	+ 10	+100	97	107	197	123	133	223
	Starting Number	+ 10	+100									
97	107	197										
123	133	223										

Calculation Policy



$24 + 15 =$
Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters.

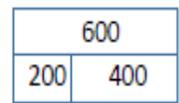
47+25



$$\begin{array}{r} 247 \\ +125 \\ \hline 372 \\ \hline 10 \end{array}$$

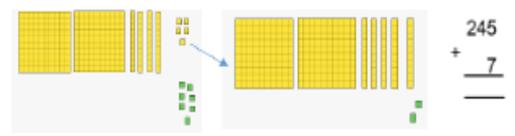
The addition symbol can be on the left or the right of the calculation.

Use the bar model to complete the number sentences.

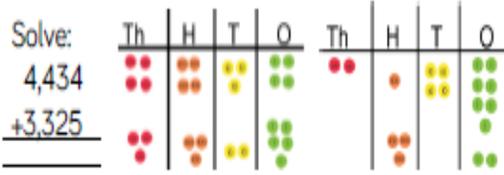
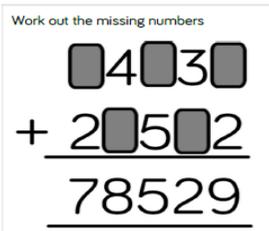
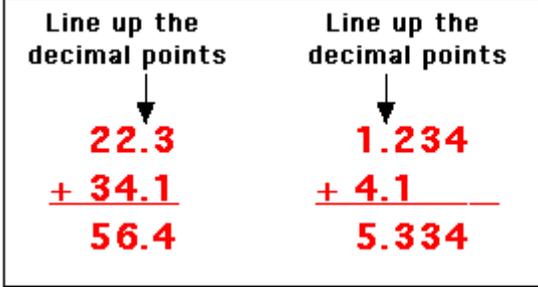
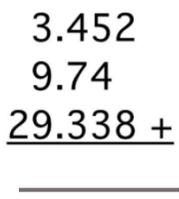


- ___ + ___ = 600
- ___ + ___ = 600
- ___ - ___ = 400
- ___ - ___ = 200
- 600 = ___ + ___
- 600 = ___ + ___
- 400 = ___ - ___
- 200 = ___ - ___

Solve $245 + 7$



Calculation Policy

	Year 4	Year 5	Year 6																				
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Addition</p>	<p>Pupils continue to practise mental methods with increasingly large numbers using models and images to help them.</p>	<p>Pupils continue to practise mental methods with increasingly large numbers using models and images to help them.</p>	<p>Pupils continue to practise mental methods with increasingly large numbers using models and images to help them.</p>																				
	<p>Written methods (progressing to more than 4-digits)</p> <p>As Year 4, progressing when understanding of the expanded method is secure, children will move on to the formal column method for whole numbers and decimal numbers as an efficient written algorithm.</p> <div style="text-align: center;">  </div> <p>Use the inverse method to calculate missing numbers.</p> <div style="text-align: center;">  </div> <p>As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here.</p>	<p>Written methods</p> <p>As year 5, progressing to larger numbers, aiming for both conceptual understanding and procedural fluency with columnar method to be secured.</p> <p>Continue calculating with decimals, including those with different numbers of decimal places</p> <div style="text-align: center;">  </div> <p>Pupils will also learn to add three decimal numbers.</p> <div style="text-align: center;">  </div> <p>Problem Solving</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><i>The addition symbol can be on the left or the right of the calculation.</i></p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><i>The amount carried over can be placed above or below the line</i></p> </div>																					
<p>Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.</p> <p style="text-align: center;">ones for a ten?</p> <p>Here is a number.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Thousands</th> <th>Hundreds</th> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">3</td> <td style="text-align: center;">8</td> <td style="text-align: center;">2</td> </tr> </tbody> </table> <p>Add three hundreds to the number. Subtract 4 thousands. Subtract 2 ones. Add 5 tens. What number do you have now?</p> <p>Add the place value counters together.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>1,000s</th> <th>100s</th> <th>10s</th> <th>1s</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">●●●</td> <td style="text-align: center;">●●</td> <td style="text-align: center;">●●●●</td> <td style="text-align: center;">●●</td> </tr> <tr> <td style="text-align: center;">●●●</td> <td style="text-align: center;">●●</td> <td style="text-align: center;">●</td> <td style="text-align: center;">●●●</td> </tr> </tbody> </table> <p>Can you write this as a calculation? (3,242 + 2,213) Now complete the question 3,242 + 213 in the same way. What is the same and what's different? Look at how the place value columns are lined up in the new question. How is our answer different? Why?</p> <p>Written methods (progressing to 4-digits)</p> <p>Expanded column addition modelled with place value counters, progressing to calculations with 4-digit numbers.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><i>The addition symbol can be on the left or the right of the calculation.</i></p> </div> <p style="margin-left: 40px;"> $200 + 40 + 7$ $100 + 20 + 5$ $300 + 60 + 12 = 372$ </p> <p>Pupils should be taught the use of expanded and then column method for addition.</p>	Thousands	Hundreds	Tens	Ones	5	3	8	2	1,000s	100s	10s	1s	●●●	●●	●●●●	●●	●●●	●●	●	●●●			
Thousands	Hundreds	Tens	Ones																				
5	3	8	2																				
1,000s	100s	10s	1s																				
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●●●	●●	●	●●●																				

Calculation Policy

$$\begin{array}{r} 6374 \\ 2823 + \\ \hline 9197 \\ 1 \\ \hline 1100 \end{array}$$

$$\begin{array}{r} 6374 \\ 2823 + \\ \hline 7 \\ 90 \\ \hline 8000 \\ 9197 \end{array}$$

The amount carried over can be placed above or below the line

H	T	U	1/10	1/100
		4	2	3
		3	1	4
		7	3	7

The addition symbol can be on the left or the right of the calculation.

Teachers should ensure that pupils have the opportunity to apply their knowledge in a variety of contexts and problems (exploring cross curricular links) to deepen their understanding.

All the missing digits are the same. Find the missing digits.

$$\begin{array}{r} 522470 \\ +305904 \\ \hline 900302 \end{array}$$

Whole unknown:

3 children go to the cinema. They each pay £13.75. How much do they spend altogether?

?		
13.75	13.75	13.75

1

Compact written method

Extend to numbers with at least four digits.

789 + 642 becomes

$$\begin{array}{r} 2634 \\ +4517 \\ \hline 7151 \\ \hline \end{array}$$

$$\begin{array}{r} 789 \\ +642 \\ \hline 1431 \\ \hline \end{array}$$

Answer: 1431

Find the missing numbers.
What methods did you use?

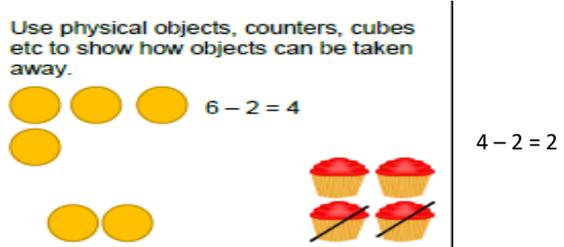
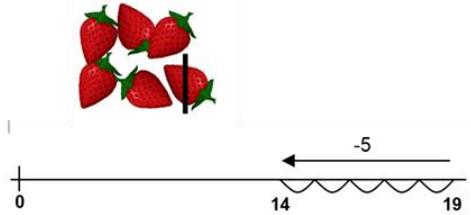
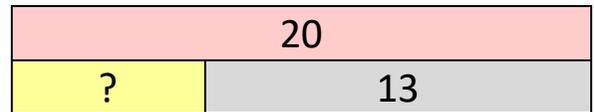
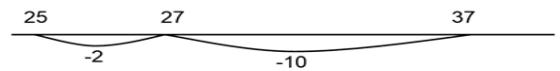
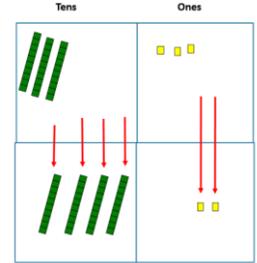
3465	
2980	



Children should be able to make the choice of reverting to expanded methods if experiencing any difficulty.

Extend to up to two places of decimals (same number of decimal places) and adding several numbers (with different numbers of digits).

Calculation Policy

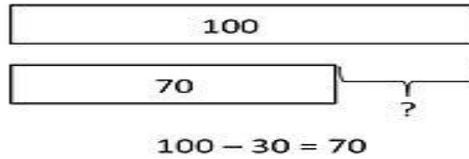
	Year 1	Year 2	Year 3
Subtraction	<p>Pupils memorise and reason with number bonds in several forms ($16 - 7 = 9$ $7 = 16 - 9$)</p> <p>Missing number problems e.g. $7 = \square - 9$; $20 - \square = 9$; $15 - 9 = \square$; $\square - \square = 11$; $16 - 0 = \square$</p> <p>Use physical objects, counters, cubes etc to show how objects can be taken away.</p>  <p>4 - 2 = 2</p> <p>Understand subtraction as take-away:</p>  <p>Understand subtraction as finding the difference:</p> <p>Count back on a number line or number track</p>  <p>Start at the bigger number and count back the smaller number showing the jumps on the number line.</p> <p>7 - 3 =</p> <p>Understand how to use a hundred square to take away and find the difference.</p>	<p>Practise subtraction to 20 becoming increasingly fluent in deriving facts (such as; $10 - 7 = 3$ $7 = 10 - 3$ to calculate $100 - 70 = 30$ $70 = 100 - 30$)</p> <p>Missing number problems e.g. $52 - 8 = \square$; $\square - 20 = 25$; $22 = \square - 21$; $6 + \square + 3 = 11$</p> <p>$20 - ? = 13$</p>  <p>Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.</p>  <p>13 - 4</p> <p>Use counters and move them away from the group as you take them away counting backwards as you go.</p>  <p>Use number lines to model take-away and difference. E.g.</p> 	<p>Practise solving varied subtraction questions – calculations with two digit numbers, the answers exceed 100.</p> <p>Missing number problems e.g. $\square = 43 - 27$; $145 - \square = 138$; $274 - 30 = \square$; $245 - \square = 195$; $532 - 200 = \square$; $364 - 153 = \square$</p> <p>Written methods – (Start at the end of Year 2 for those who are ready)</p> <p>Recording addition and subtraction in expanded columns can support understanding of the quantity aspect of place value and prepare for efficient written methods with larger numbers. The numbers may be represented with Dienes apparatus. E.g. $75 - 42$</p>  <p>70 5 - 40 2 ----- 30 3</p> <p>$47 - 24 = 23$</p> <p>$\begin{array}{r} 40 + 7 \\ - 20 + 4 \\ \hline 20 + 3 \end{array}$</p> <p>The subtraction symbol can be on the left or the right of the calculation.</p> <p>Written methods (progressing to 3-digits)</p>

Calculation Policy

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

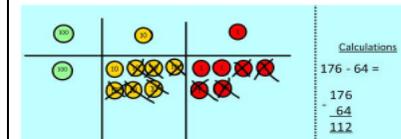
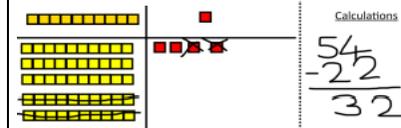
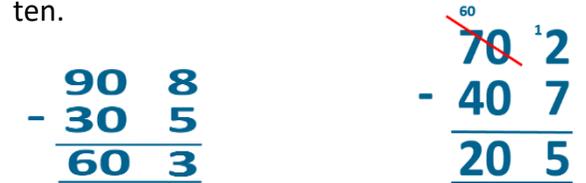


This can progress all the way to counting back using two 2 digit numbers.

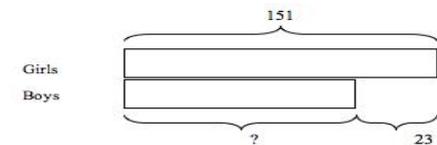


For subtraction number lines, the jumps come under the line.

Introduce expanded column subtraction with no decomposition, modelled with place value counters or dienes e.g $- 364 - 122$
For some children this will lead to exchanging, modelled using [place value counters](#) or base ten.



Bar modelling should be used to help solve missing number problems



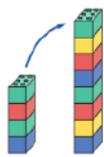
Calculation Policy

	Year 4	Year 5	Year 6
Subtraction	<p>✓ Partitioning and decomposition</p> <p>✓ Decomposition</p> $\begin{array}{r} 6141 \\ \underline{764} \\ - 86 \\ \hline 668 \end{array}$ <p>Children should:</p> <ul style="list-style-type: none"> ✓ <i>be able to subtract numbers with different numbers of digits;</i> ✓ <i>using this method, children should also begin to find the difference between two three-digit sums of money, taking into account the pence and the pounds;</i> ✓ <i>know that decimal points should line up under each other.</i> 	<p>Formal Methods of Decomposition</p> $\begin{array}{r} 3131 \\ \underline{6467} \\ - 2684 \\ \hline 3783 \end{array}$ <p>Children should:</p> <ul style="list-style-type: none"> ✓ <i>be able to subtract numbers with different numbers of digits;</i> ✓ <i>begin to find the difference between two decimal fractions with up to three digits and the same number of decimal places;</i> ✓ <i>know that decimal points should line up under each other;</i> ✓ <i>solve problems in subtraction with four or more digits;</i> ✓ <i>be able to perform a series of decompositions using the formal method: e.g. $15000 - 246 =$</i> 	<p>Children should:</p> <ul style="list-style-type: none"> ✓ <i>be able to subtract numbers with different numbers of digits;</i> ✓ <i>be able to subtract two or more decimal fractions with up to three digits and either one or two decimal places;</i> ✓ <i>know that decimal points should line up under each other.</i>

Year 1

Through grouping and sharing small quantities, pupils begin to understand doubling numbers and quantities. The children can count in twos, fives and tens.

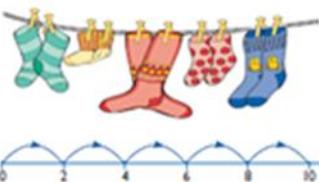
Understand multiplication is related to doubling and combining groups of the same size (repeated addition)



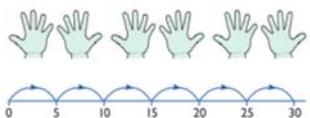
double 4 is 8
 $4 \times 2 = 8$



Washing line, and other practical resources for counting. Concrete objects. Numicon; bundles of straws, bead strings



$2 + 2 + 2 + 2 + 2 = 10$
 $2 \times 5 = 10$
2 multiplied by 5
5 pairs
5 hops of 2



$5 + 5 + 5 + 5 + 5 = 30$
 $5 \times 6 = 30$
5 multiplied by 6
6 groups of 5
6 hops of 5

Problem solving with concrete objects (including money and measures. Use cuisenaire rods and numicon to develop the vocabulary relating to 'times' –

Pick up five, 4 times. Use arrays to understand multiplication can be done in any order (commutative)

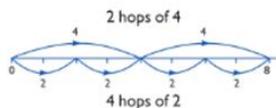


$4 \times 2 = 8$

$2 \times 4 = 8$



$4 \times 2 = 8$



2 hops of 4

4 hops of 2

Year 2

Children practise and become fluent in the 2, 5 and 10 multiplication tables. They connect the 10 multiplication table to place value.

Expressing multiplication as a number sentence using \times
Using understanding of the inverse and practical resources to solve missing number problems.

$7 \times 2 = \square$ $\square = 2 \times 7$
 $7 \times \square = 14$ $14 = \square \times 7$
 $\square \times 2 = 14$ $14 = 2 \times \square$
 $\square \times \bigcirc = 14$ $14 = \square \times \bigcirc$

Develop understanding of multiplication using array and number lines (see Year 1). Include multiplications not in the 2, 5 or 10 times tables. Begin to develop understanding of multiplication as scaling (3 times bigger/taller).



$5 + 5 + 5 = 15$

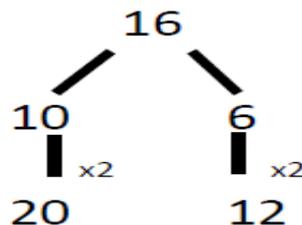
$3 + 3 + 3 + 3 + 3 = 15$

$5 \times 3 = 15$

$3 \times 5 = 15$

Towards written methods

Use jottings to develop an understanding of doubling two digit numbers.



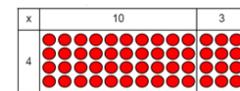
Year 3

Practise their recall of multiplication tables and through doubling they connect the 2, 4 and 8 multiplication tables.

Doubling 2 digit numbers using partitioning – using jottings from Year 2.

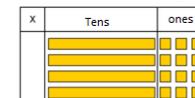
Written methods (progressing to 2d x 1d)

Developing written methods using understanding of visual images. Show the link with arrays to first introduce the grid method.



4 rows of 10
4 rows of 3

Move on to using Base 10 to move towards a more compact method.



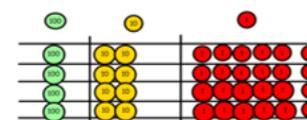
4 rows of 13

Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.



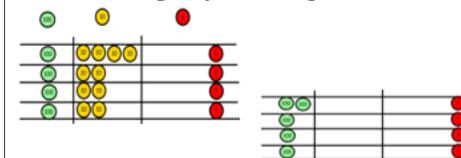
Calculations
 4×126

Fill each row with 126.



Calculations
 4×126

Add up each column, starting with the ones making any exchanges needed.

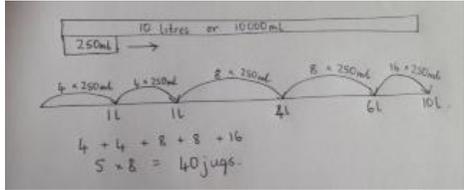


Then you have your answer.

Calculation Policy

			<p>This leads into the compact method.</p> $\begin{array}{r} 1 \\ 26 \\ \times 3 \\ \hline 78 \end{array}$																												
Multiplication	Year 4	Year 5	Year 6																												
	<p>Recall all multiplication facts up to 12×12. Counting in multiples of 6, 7, 9, 25 and 1000, and steps of $1/100$. Solving practical problems where children need to scale up. Relate to known number facts. (E.g. how tall would a 25cm sunflower be if it grew 6 times taller.</p> <p>Begin by using counting objects and resources.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Hundreds</th> <th>Tens</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">●</td> <td style="text-align: center;">●●</td> <td style="text-align: center;">●●●●●</td> </tr> <tr> <td style="text-align: center;">●</td> <td style="text-align: center;">●●</td> <td style="text-align: center;">●●●●●</td> </tr> <tr> <td style="text-align: center;">●</td> <td style="text-align: center;">●●</td> <td style="text-align: center;">●●●●●</td> </tr> </tbody> </table> <p>$126 \times 3 =$</p> <p>Then use this to lead into grid multiplication</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>x</td> <td>100</td> <td>20</td> <td>6</td> </tr> <tr> <td>3</td> <td>300</td> <td>60</td> <td>18</td> </tr> </table> <p>$300 + 60 + 18$</p> <p>Leading to expanded vertical method</p> $\begin{array}{r} 126 \\ \times 3 \\ \hline 18 \text{ (3 x 6)} \\ 60 \text{ (3 x 20)} \\ 300 \text{ (3 x 100)} \\ \hline 378 \end{array}$ <p>Compact vertical method</p> $\begin{array}{r} 126 \\ \times 3 \\ \hline 378 \\ 1 \end{array}$ <p>It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.</p>	Hundreds	Tens	Units	●	●●	●●●●●	●	●●	●●●●●	●	●●	●●●●●	x	100	20	6	3	300	60	18	<p>Identify multiples and factors and factor pairs of numbers. Know and use prime numbers and prime factors. Recognise squared and cubed numbers (using the correct notation).</p> <p>Begin with grid method</p> <p>$47 \times 36 =$</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>x</td> <td>40</td> <td>7</td> </tr> <tr> <td>30</td> <td>1200</td> <td>210</td> </tr> <tr> <td>6</td> <td>240</td> <td>42</td> </tr> </table> $\begin{array}{r} 1200 \\ + 240 \\ 210 \\ \hline 42 \\ \hline 1692 \end{array}$ <p>Leading to expanded vertical</p> $\begin{array}{r} 47 \\ \times 36 \\ \hline 42 \text{ (6x7)} \\ 240 \text{ (6x40)} \\ 210 \text{ (30x7)} \\ 1200 \text{ (30x40)} \\ \hline 1692 \end{array}$ <div style="border: 1px solid black; padding: 5px; margin-left: 100px; width: fit-content;"> <p>Notice that we start by multiplying the digit in the one's place first.</p> </div> <p>Compact Vertical Method</p> $\begin{array}{r} 2 \\ 24 \\ \times 16 \\ \hline 144 \\ 240 \\ \hline 384 \end{array}$	x	40	7	30	1200	210	6	240	42
Hundreds	Tens	Units																													
●	●●	●●●●●																													
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Calculation Policy

			
Division	Year 1	Year 2	Year 3
	Through sharing small quantities, children begin to understand division, and finding simple fractions of amounts and quantities.	Children practise and become fluent in their recall of the 2, 5 and 10 division facts.	Children practise and become fluent in the recall of the 2, 3, 4 and 8 division facts.

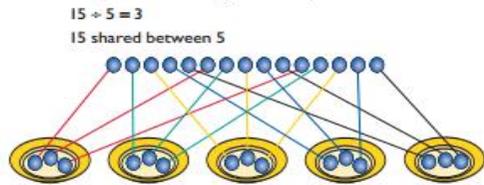
Calculation Policy

Children must have secure counting skills- being able to confidently count in 2s, 5s and 10s. Children should be given opportunities to reason about what they notice in number patterns.

Group AND share small quantities- understanding the difference between the two concepts.

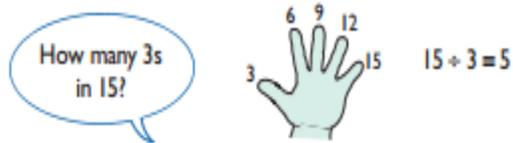
Sharing

Develops importance of one-to-one correspondence.



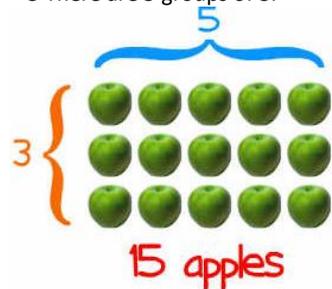
Grouping

Children should apply their counting skills to develop some understanding of grouping.



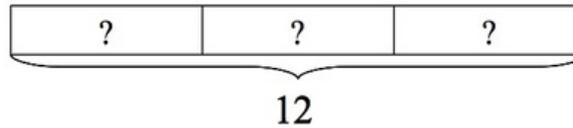
Arrays

Use of arrays as a pictorial representation for division. $15 \div 3 = 5$ There are 5 groups of 3.



Sharing using a bar model!

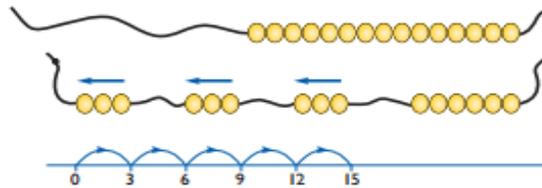
$12 \div 3 = ?$



Grouping on a number line

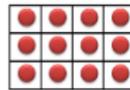
Group from zero in jumps of the divisor to find our 'how many groups of 3 are there in 15?'

15 divided by 3



Arrays

Continue work on arrays. Support children to understand how multiplication and division are inverse. Look at an array – what do you see?



$3 \times 4 = 12$

$12 \div 4 = 3$

Missing number problems.



$20 = \square \times 5$

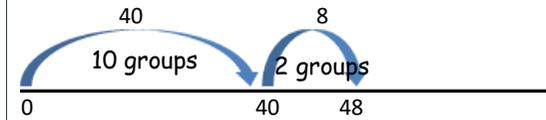


$3 = \square \div 6$

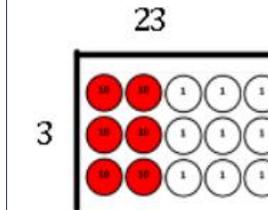
Becoming more efficient using a numberline

Children need to be able to partition the dividend in different ways.

$48 \div 4 = 12$

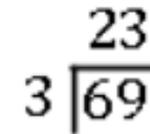


Extending divisions to resemble written method of short division.



$69 \div 3 = 23$

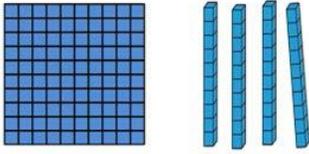
Progressing to the formal written method of short division:



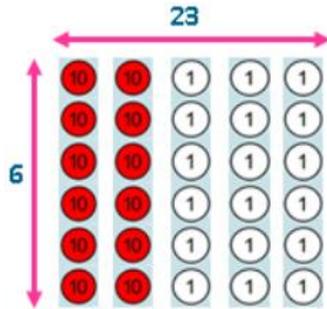
Divis	Year 4	Year 5	Year 6
	Children should know all the division facts up to 12×12	Undertake mental divisions with increasingly hard numbers and decimals.	Undertake mental divisions with increasingly hard numbers and decimals.

Calculation Policy

Use base 10 blocks to divide by 10
 $140 \div 10 = 14$



Grouping/sharing counters are used to make the link with short division



Leads directly onto:

$$\begin{array}{r} 023 \\ 6 \overline{) 138} \\ \underline{12} \\ 18 \\ \underline{18} \\ 0 \end{array}$$

$138 \div 6 = 23$

Showing remainder as a whole number:

$$\begin{array}{r} 858 \text{ r } 2 \\ 3 \overline{) 25726} \end{array}$$

Answer: 858 remainder 2

Showing remainder as a fraction:

$$\begin{array}{r} 858 \text{ r } 2 \\ 3 \overline{) 25726} \end{array}$$

Answer: $858 \frac{2}{3}$

HTU \div TU (Using factor pairs as divisors)

$558 \div 18 =$

Step 1: Identify a pair of factors for the divisor e.g. $18 = 3 \times 6$
 Step 2: Divide by one of the factors.

Step 3: Divide the answer by the other factor.

HTU \div TU (beginning to look at precursor to

$$\begin{array}{r} 186 \\ 3 \overline{) 558} \end{array} \quad \begin{array}{r} 31 \\ 6 \overline{) 186} \end{array}$$

Answer: $558 \div 18 = 31$

chunking as a long division)

$$\begin{array}{r} 4 \\ \cancel{5} 158 \\ - 360 \quad (20 \times 18) \\ \hline 198 \\ - 180 \quad (10 \times 18) \\ \hline 18 \\ - 18 \quad (1 \times 18) \\ \hline 0 \end{array}$$

Answer: $558 \div 18 = 31$

\div = signs and missing numbers

Continue using a range of equations but with appropriate numbers

Sharing and Grouping and using a number line

Children will continue to explore division as sharing and grouping, and to represent calculations on a number line as appropriate.

Remainders should be expressed as decimals and fractions.

$496 \div 11$ becomes

$$\begin{array}{r} 45 \text{ r } 1 \\ 11 \overline{) 496} \end{array}$$

Answer: $45 \frac{1}{11}$

Long Division

$432 \div 15$ becomes

$$\begin{array}{r} 28 \text{ r } 12 \\ 15 \overline{) 432} \\ \underline{30} \\ 132 \\ \underline{120} \\ 12 \end{array}$$

Answer: 28 remainder 12

$432 \div 15$ becomes

$$\begin{array}{r} 28 \\ 15 \overline{) 432} \\ \underline{30} \\ 132 \\ \underline{120} \\ 12 \end{array} \quad \begin{array}{l} 15 \times 20 \\ 15 \times 8 \end{array}$$

$$\frac{12}{15} = \frac{4}{5}$$

Answer: $28 \frac{4}{5}$

$432 \div 15$ becomes

$$\begin{array}{r} 28.8 \\ 15 \overline{) 432.0} \\ \underline{30} \\ 132 \\ \underline{120} \\ 120 \\ \underline{120} \\ 0 \end{array}$$

Answer: 28.8