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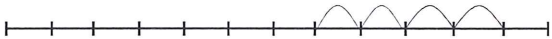
Policy for Written

Calculations in

Mathematics

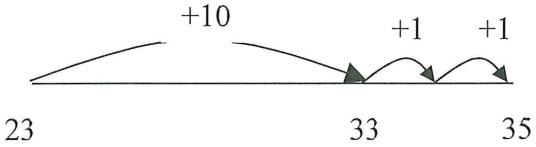


Addition – Year 1

Mental methods	Formal written methods								
<p>Represent and use number bonds and related subtraction facts <u>within</u> 20.</p> <p>Example: $3 + 6 = 9$ $9 + 8 = 17$</p> <p>Use number bond facts to 10 to recognise bands to 100 Example: $30 + 60 = 90$</p> <p>Using number lines to support: $7 + 4 = 11$</p>  <p>Promoting covering up of operations and numbers.</p> <table style="width: 100%; border: none;"> <tr> <td style="padding-right: 20px;">$3 + 4 = \square$</td> <td>$\square = 3 + 4$</td> </tr> <tr> <td style="padding-right: 20px;">$3 + \square = 7$</td> <td>$7 = \square + 4$</td> </tr> <tr> <td style="padding-right: 20px;">$\square + 4 = 7$</td> <td>$7 = 3 + \square$</td> </tr> <tr> <td style="padding-right: 20px;">$\square + \nabla = 7$</td> <td>$7 = \square + \nabla$</td> </tr> </table> <p>Pictorial representations to support adding 2 digit and 1 digit numbers. Example: $9 + 8 = 17$</p>	$3 + 4 = \square$	$\square = 3 + 4$	$3 + \square = 7$	$7 = \square + 4$	$\square + 4 = 7$	$7 = 3 + \square$	$\square + \nabla = 7$	$7 = \square + \nabla$	<p>At this stage, children can be introduced to the layout of the columnar method as addition problems can be set out in horizontal form:</p> <p>$7 + 4 = 11$</p> <p>And vertical form:</p> $\begin{array}{r} 7 \\ + 4 \\ \hline 11 \end{array}$ <p>This then progresses onto 2 digit numbers without any carrying</p> $\begin{array}{r} 34 \\ + 23 \\ \hline 57 \end{array}$
$3 + 4 = \square$	$\square = 3 + 4$								
$3 + \square = 7$	$7 = \square + 4$								
$\square + 4 = 7$	$7 = 3 + \square$								
$\square + \nabla = 7$	$7 = \square + \nabla$								

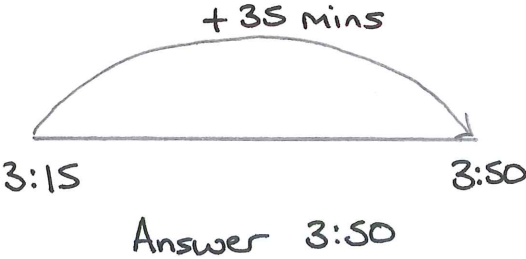


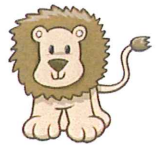
Addition – Year 2

Mental methods	Formal written methods									
<p>By this stage, children should be fluent at answering questions related to number bonds with 20.</p> <p>A range of mental methods can be used to support mental addition. (Jottings can be used to support the mental work.)</p> <p><i>Add 9 or 11 by adding 10 and adjusting by 1</i></p> $35 + 9 = 44$ <p><i>This can also be modelled using a number square:</i></p> <table border="1" data-bbox="209 1055 438 1200"> <tr> <td>23</td> <td>24</td> <td>25</td> </tr> <tr> <td>33</td> <td>34</td> <td>35</td> </tr> <tr> <td>43</td> <td>44</td> <td>45</td> </tr> </table> <p><i>Partitioning a number to help with addition:</i></p> $23 + 12 = 23 + 10 + 1 + 1$ $= 33 + 1 + 1$ $= 35$  <p>And:</p> $23 + 42$	23	24	25	33	34	35	43	44	45	<p>Pupils should be able to add three one-digit numbers using horizontal addition:</p> $4 + 5 + 6 = 15$ <p>By using number bonds to 10 (where appropriate) and starting with the larger number.</p> $6 + 4 + 5 = 15$ <p>Pupils to apply number facts to multiples of ten</p> $40 + 50 + 60 = 150$ <p>Using their understanding numbers bonds.</p> <p>Children can also perform TU + U using column method (where carrying is necessary):</p> $\begin{array}{r} 16 \\ + 9 \\ \hline 25 \end{array}$ <p>and TU + TU (where carrying is necessary):</p> $\begin{array}{r} 27 \\ + 36 \\ \hline 63 \end{array}$ <p>Continue using a range of equations as in Year 1 but with appropriate, larger numbers.</p> <p>Extending to</p> $14 + 5 = 10 + \square$ <p>and adding three numbers</p> $32 + \square + \square = 100$ $35 = 1 + \square + 5$
23	24	25								
33	34	35								
43	44	45								



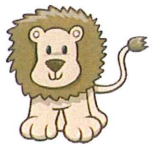
Addition - Year 3

Mental methods	Formal written methods
<p>Use jottings (such as number lines), and counting on strategies (such as using fingers) to mentally add a three-digit number and a one-digit number: $345 + 7$</p> <p>Three-digit number and tens: $345 + 30$</p> <p>And three-digit number and hundreds: $345 + 400$.</p> <p>Use number bonds and partitioning to mentally calculate answers to questions like: $67 - 28$ "67 takeaway 20 is 47 and then 47 takeaway 8 is 39"</p> <p>Pupils will use number lines to calculate simple differences in time problems. For example: I leave the house at 3:15 and it takes 35 minutes to reach my friend's house. What time did I reach my friend's house?</p> <div style="text-align: center;">  </div>	<p>Children build on year 2 learning by adding HTU + TU where carrying is necessary:</p> $\begin{array}{r} 328 \\ + \quad 63 \\ \hline 391 \\ \quad \quad \quad 1 \end{array}$ <p>Then on to HTU + HTU with carrying in two or more columns:</p> $\begin{array}{r} 358 \\ + 265 \\ \hline 623 \\ \quad \quad \quad 1 \quad 1 \end{array}$ <p>Pupils are introduced to the concept of simple missing number problems to check their understanding of the process of addition:</p> $\begin{array}{r} 3 \square \\ + \square 7 \\ \hline 81 \end{array}$




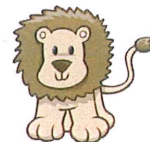
Addition - Year 4

Mental methods	Formal written methods
<p>At this stage, pupils should use a <i>range</i> of methods to solve mental problems.</p> <p>Use number lines to find differences in times, where times are to the nearest 5 minute interval:</p> <p>I leave home at 8:50am and arrive at school at 9:05am. How long did my journey take?</p> <p style="text-align: center;">Total time 15 mins.</p>	<p>Pupils progress onto adding ThHTU and HTU:</p> $\begin{array}{r} 3427 \\ + 715 \\ \hline 4142 \end{array}$ <p>Then onto ThHTU + ThHTU:</p> $\begin{array}{r} 7649 \\ 6421 \\ \hline 14070 \end{array}$ <p>Children should be able to add several numbers using the columnar method and recognise that they will need to carry numbers other than 1:</p> $\begin{array}{r} 347 \\ 256 \\ 498 \\ \hline 1101 \\ \small{2 \quad 2} \end{array}$
<p>Pupils will add two or more fractions with the same denominator:</p> $\frac{3}{5} + \frac{4}{5} = \frac{7}{5}$ $\frac{2}{7} + \frac{1}{7} + \frac{3}{7} = \frac{6}{7}$ <p>Pupils will subtract pupils with the same denominator:</p> $\frac{8}{10} - \frac{4}{10} = \frac{4}{10}$	<p>Pupils will begin to add decimals in context (for example, in money) where decimals are written to the same decimal places:</p> $\begin{array}{r} 2.41 \\ 5.76 \\ \hline 8.17 \end{array}$ <p>Pupils continue to solve missing number problems to check their understanding of the process of addition:</p> $\begin{array}{r} \square 2 \square \\ 3 \square 9 \\ \hline 716 \end{array}$



Addition - Year 5

Mental methods	Formal written methods
<p>At this stage, pupils should use a <i>range</i> of methods to solve mental addition problems with increasingly larger numbers.</p> <p>When adding measures, children should be able to use number facts to convert and either use a mental method or written method to solve the problem:</p> <p>3.2m + 355cm 320cm + 355cm = 675cm or 6.75m</p> <p>Methods of adding numbers should be applied to decimal numbers:</p> <p>For example near doubles:</p> <p>1.4 + 1.5 = 2.9</p> <p>Be able to solve mental problems involving negative numbers:</p> <p>-3 + 5 = 2</p> <p>Use number lines to find differences in times, where times are to the nearest minute:</p> <p>For example: I leave home at 8:53am and arrive at school at 9:18am. How long did my journey take?</p> <p style="text-align: right;">18 + 7 = 25 mins</p>  <p>Add fractions with the same denominator but where the answer is greater than 1 and representing the answer as either a mixed number or improper fraction.</p> $\frac{3}{7} + \frac{5}{7} = \frac{8}{7} \text{ or } 1\frac{1}{7}$	<p>Children should add two numbers greater than 10,000 using the columnar method.</p> $\begin{array}{r} 11358 \\ + 12173 \\ \hline 23531 \\ 11 \end{array}$ <p>Children should be able to add several numbers of varying sizes using columnar method:</p> $\begin{array}{r} 1358 \\ 83 \\ + 173 \\ \hline 1614 \\ 21 \end{array}$ <p>Then progressing to adding decimals up to three decimal places and of varying sizes:</p> $\begin{array}{r} 2.37 + 4.378 + 32.6 \\ 2.370 \\ 4.378 \\ + 32.600 \\ \hline 39.348 \\ 11 \end{array}$ <p>Pupils solve more complex missing number problems to check their understanding of the process of addition:</p> $\begin{array}{r} 8 \square 5 \square \\ + \square 6 \square 8 \\ \hline 13231 \end{array}$

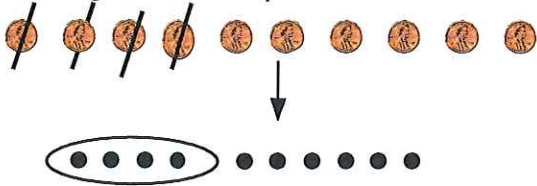


Addition – Year 6

Mental methods	Formal written methods
<p>Be able to use a range of strategies and apply to decimals and whole numbers using jottings where necessary to support mental work.</p> <p>Pupils should be able to apply their methods for calculating time intervals to problems:</p> <ul style="list-style-type: none"> - Where they calculate the <u>interval</u> after being given the start and end time. - Where they calculate the <u>end time</u> after being given the start time and interval. - Where they calculate the <u>start time</u> after being given the interval and end time. <p>Using number lines to support their calculations.</p> <p>Add fractions where the denominations are different:</p> $\frac{3}{5} + \frac{4}{7}$ $\frac{7 \times 3}{7 \times 5} + \frac{4 \times 5}{7 \times 5} = \frac{21}{35} + \frac{20}{35}$ $= \frac{41}{35} \text{ or } 1\frac{6}{35}$ <p>Adding mixed numbers where the mixed numbers need to be converted to improper fractions before adding:</p> $2\frac{1}{3} + 3\frac{2}{5} \rightarrow \frac{7}{3} + \frac{17}{5}$ $\frac{7 \times 5}{3 \times 5} + \frac{17 \times 3}{5 \times 3} = \frac{35}{15} + \frac{51}{15}$ $= \frac{86}{15} = 5\frac{11}{15}$	<p>Pupils should be fluent in adding several whole numbers or decimals of different sizes when solving problems using columnar method:</p> <p>$7\text{g} + \frac{1}{2}\text{kg} + 0.27\text{kg}$</p> $\begin{array}{r} 270 \\ 500 \\ + \quad 7 \\ \hline 777 \end{array}$ <p>Answer 777g or 0.777kg.</p> <p>Adding 3 or more larger numbers</p> $\begin{array}{r} 1492341 \\ 356982 \\ 36759 \\ \hline 4398 \\ \hline 1890480 \\ \hline 12222 \end{array}$ <p>Pupils should be fluent in adding decimals where the decimals are in different places presented in horizontal form:</p> <p>$3.4 + 2.78 + 32.78 + 2.145 =$</p> $\begin{array}{r} 3.400 \\ 2.780 \\ 32.780 \\ 2.145 \\ \hline 41.105 \\ \hline 122 \end{array}$

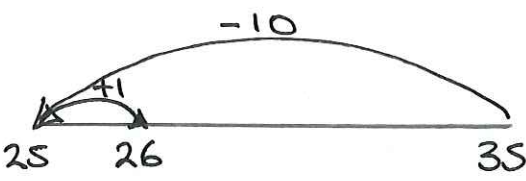
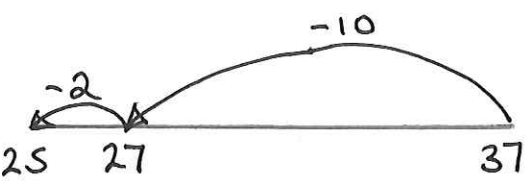
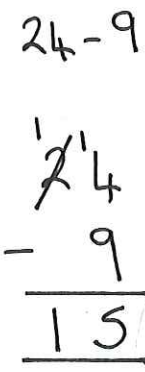
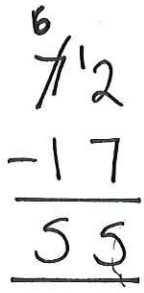


Subtraction – Year 1

Mental methods	Formal written methods								
<p><i>Pictures / marks</i> Sam spent 4p. What was his change from 10p?</p>  <p><i>Use number lines to model the process of counting on.</i></p> <p>$11 - 7 = 4$</p> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: fit-content; margin: 10px auto;"> <p>I put 7 in my head and count on until I reach 11. I have counted on 4.</p> </div> <p><i>Promoting the covering up of operations and numbers</i></p> <p><u>- = signs and missing numbers</u></p> <table style="width: 100%; border: none;"> <tr> <td style="padding: 5px;">$7 - 3 = \square$</td> <td style="padding: 5px;">$\square = 7 - 3$</td> </tr> <tr> <td style="padding: 5px;">$7 - \square = 4$</td> <td style="padding: 5px;">$4 = \square - 3$</td> </tr> <tr> <td style="padding: 5px;">$\square - 3 = 4$</td> <td style="padding: 5px;">$4 = 7 - \square$</td> </tr> <tr> <td style="padding: 5px;">$\square - \nabla = 4$</td> <td style="padding: 5px;">$4 = \square - \nabla$</td> </tr> </table>	$7 - 3 = \square$	$\square = 7 - 3$	$7 - \square = 4$	$4 = \square - 3$	$\square - 3 = 4$	$4 = 7 - \square$	$\square - \nabla = 4$	$4 = \square - \nabla$	<p>At this stage, pupils are introduced to the layout of the columnar method for subtraction, noting that the larger number must always be on the top line.</p> <p>$9 - 6 =$</p> $\begin{array}{r} 9 \\ - 6 \\ \hline 3 \end{array}$ <p>Pupils are introduced to TU – TU where there is no borrowing required:</p> $\begin{array}{r} 49 \\ - 23 \\ \hline 26 \end{array}$
$7 - 3 = \square$	$\square = 7 - 3$								
$7 - \square = 4$	$4 = \square - 3$								
$\square - 3 = 4$	$4 = 7 - \square$								
$\square - \nabla = 4$	$4 = \square - \nabla$								


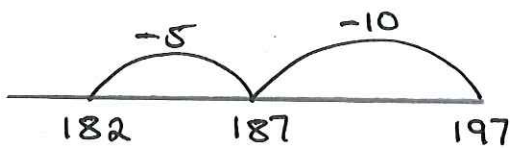
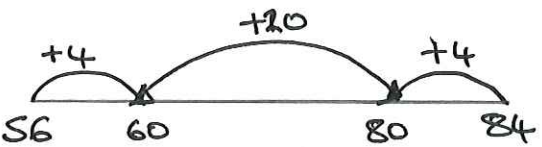



Subtraction – Year 2

Mental methods	Formal written methods
<p>By this stage, pupils should be more confident in answering questions related to number bonds within 20:</p> <p>$17 - 5 = 12$</p> <p>Promoting the covering up of operations and numbers</p> <p>$14 + 5 = 20 - \square$ $17 - \square = 10 + 4$</p> <p>Subtract 9 or 11. Begin to add/subtract 19 or 21 $35 - 9 = 26$</p>  <p>Use known number facts and place value to subtract (partition second number only) $37 - 12 = 37 - 10 - 2$ $= 27 - 2$ $= 25$</p> 	<p>Building on from the introduction of the columnar method in year 1, pupils should carry out calculations like TU – U where <u>borrowing</u> is required:</p> <p><u>The use of language is important. Use the term "borrow".</u></p> <p>$24 - 9 =$</p>  <div data-bbox="1045 828 1396 1097" style="border: 1px solid black; border-radius: 50%; padding: 10px; width: fit-content; margin-left: auto;"> <p>Can't do 2-7 so borrow one ten across into the ones column to make 12</p> </div> <p>And TU – TU where <u>borrowing</u> is required.</p> 

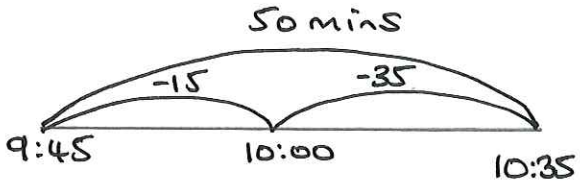


Subtraction - Year 3

Mental methods	Formal written methods
<p>Find a small difference between larger numbers by counting up:</p> $102 - 95 = 7$  <p>Use known number facts and place value to subtract (partition second number only)</p> $197 - 15 =$ $197 - 10 - 5 =$  <p>Find difference between larger numbers by counting on from lower number to higher number passing important check points.</p> $84 - 56 = 28$ <p style="text-align: center;">Total = 28</p>  <p>Pupils will partition numbers to subtract mentally with jottings:</p> $258 - 3 = 200 + 50 + (8 - 3)$ $= 200 + 50 + 5$ $= 255$ $258 - 30 = 200 + 50 + 8 - 30$ $= 200 + (50 - 30) + 8$ $= 200 + 20 + 8$ $= 228$	<p>Pupils consolidate their understanding of concept of decomposition, Progressing onto HTU – HTU where hundreds and tens will need to be moved into the tens and units column:</p> $213 - 175$  $\begin{array}{r} 213 \\ - 175 \\ \hline 038 \end{array}$ <p>Pupils are introduced to missing number problems involving subtraction:</p> $\begin{array}{r} 7 \square \\ - \square 6 \\ \hline 26 \end{array}$



Subtraction - Year 4

Mental methods	Formal written methods
<p>Introduce subtracting fractions with the same denominator:</p> $\frac{7}{8} - \frac{3}{8} = \frac{4}{8}$ <p>The concept of negative numbers is introduced at this stage with pupils counting backwards past zero.</p> <p>6, 5, 4, 3, 2, 1, 0, -1, -2...</p> <p>Number lines can be used to find the start time of an event when the end time and the duration is known. Problems are in intervals of 5 minutes.</p> <p>I arrive at the shops at 10:35 and my journey took 50 minutes. What time did I start out?</p> 	<p>Pupils can progress on to ThHTU – HTU where tens, hundreds or thousands will need to be moves across columns and what they should do if there are zeros in columns.</p> $\begin{array}{r} \overset{0}{\cancel{1}}'0 \quad \overset{8}{\cancel{9}}'2 \\ 364 \\ \hline 728 \end{array}$ <p>Further progress is through ThHTU – ThHTU where borrowing is required.</p> $\begin{array}{r} \overset{2}{\cancel{3}}'2 \quad \overset{2}{\cancel{3}}'1 \\ 1426 \\ \hline 1805 \end{array}$ <p>Pupils continue to show their understanding of the formal method for subtraction through missing number problems.</p> $\begin{array}{r} 2 \square 7 \\ \square 8 \square \\ \hline 021 \end{array}$



Subtraction - Year 5

Mental methods	Formal written methods
<p>Pupils can use number lines to find an answer to a problem where the answer is a negative number</p> <p>$5 - 9 = -4$</p> <p>NOTE: when a calculation involving a negative answer takes place, the use of the term "negative" should be used. If the problem is in the context of temperature, then "minus" should be used.</p> <p>Subtract fractions where a conversion from a mixed number to an improper fraction is required, but the denominators are the same:</p> <p>$1\frac{1}{5} - \frac{4}{5}$ $1\frac{1}{5} = \frac{6}{5}$</p> <p>$\frac{6}{5} - \frac{4}{5} = \frac{2}{5}$</p> <p>Number lines can be used to find the start time of an event when the end time and the duration is known. Problems are in intervals of 1 minute.</p> <p>I arrive at the shops at 10:32 and my journey took 53 minutes. What time did I start out?</p> <p>Answer 9:39</p>	<p>Pupils will work with numbers greater than 9999:</p> <p>They should apply the column method of subtraction to decimal problems:</p> <p>$1.8 - 0.4 = 1.4$ and $1.4 - 0.8 = 0.6$</p> <p>They should apply the column method of subtraction to decimal problems where the decimals are up to three decimal places and varying sizes:</p> <p>$23.4 - 3.712 = 19.488$</p>


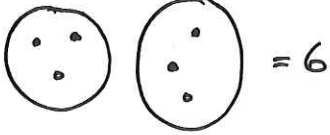
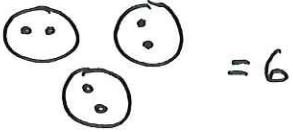


Subtraction – Year 6

Mental methods	Formal written methods
<p>Be able to use a range of strategies and apply these to both decimal and whole numbers using jottings where necessary to support mental work.</p> <p>Subtract fractions where the denominators are different:</p> $\frac{7}{8} - \frac{3}{4} = \frac{4 \times 7}{4 \times 8} - \frac{3 \times 2}{4 \times 2}$ $= \frac{28}{32} - \frac{24}{32} = \frac{4}{32}$ <p>Find the difference between larger positive and negative numbers:</p> $43 - 72 = -29$ <p>Pupils will subtract mixed numbers that have different denominators:</p> $2\frac{1}{3} - 1\frac{1}{4}$ $\frac{7}{3} - \frac{5}{4} = \frac{4 \times 7}{4 \times 3} - \frac{5 \times 3}{4 \times 3}$ $= \frac{28}{12} - \frac{15}{12}$ $= \frac{13}{12} \text{ or } 1\frac{1}{12}$	<p>Pupils should be fluent in subtracting whole numbers or decimals of different sizes where there are zeros present:</p> <p>As part of problem solving, pupils should convert units of measure before applying a written method:</p> $1.5\text{kg} - 230\text{g} =$ $1500\text{g} - 230\text{g} = 1270\text{g or } 1.27\text{kg}$ <p>Pupils should be able to subtract one decimal from another when the decimals are not the same size:</p> $3.174 - 2.7$

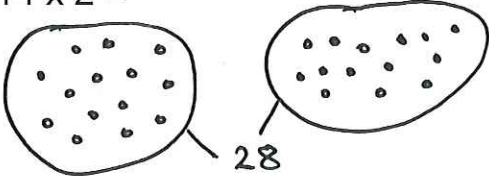
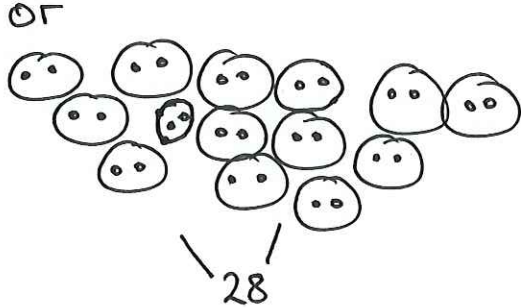


Multiplication – Year 1

Mental methods	Formal written methods
<p><u>Pictures and symbols</u></p> <p>There are 3 sweets in one bag. How many sweets are there in 5 bags?</p>  <p>Pupils will practise counting in 2's, 5's and 10's.</p>	<p>Pupils can record answers to problems involving multiplication through the use of pictures, arrays or use of practical equipment.</p> <p>$3 \times 2 =$</p>  = 6 or  = 6



Multiplication – Year 2

Mental methods	Formal written methods
<p><u>Multiplication facts</u> Pupils should learn multiplication and division facts from 2, 5 and 10 times tables using a variety of language to describe the operation used. Initially the children should be introduced to the tables in the form:</p> <p>$4 \times 1 = 4$ $4 \times 2 = 8$...</p> <p>What is 5 times 4? What is 5 groups of 4? What is 5 lots of 4?</p> <p>How many 4s are there in 20? What is 20 shared between 4?</p> <p><u>x = signs and missing numbers</u></p> <p>$7 \times 2 = \square$ $\square = 2 \times 7$ $7 \times \square = 14$ $14 = \square \times 7$ $\square \times 2 = 14$ $14 = 2 \times \square$ $\square \times \nabla = 14$ $14 = \square \times \nabla$</p> <p>Pupils will understand that multiplication is repeated addition: $3 + 3 + 3 + 3$ is the same as 3×4.</p>	<p>Horizontal multiplication problems can be solved using multiplication facts, physical materials, arrays or pictures</p> <p>$5 \times 4 = 20$</p> <p>$14 \times 2 =$</p>  <p>or</p>  <p>The formal written method of multiplication in columns is introduced to pupils:</p> $\begin{array}{r} 14 \\ \times 2 \\ \hline 28 \end{array}$ <p>"2 times 4 is 8; 2 times 1 is 2."</p>



Multiplication - Year 3

Mental methods	Formal written methods
<p><u>Multiplication facts</u> Pupils should <u>consolidate</u> understanding of multiplication and division facts from 2, 5 and 10 times tables using a variety of language to describe the operation used.</p> <p>Pupils should be <u>introduced to</u>, and <u>learn</u>, the multiplication and division facts from 3, 4 and 8 times tables using a variety of language to describe the operation used.</p> <p>What is 8 times 4? What is 8 groups of 4? What is 8 lots of 4?</p> <p>How many 4s are there in 32? What is 32 shared between 4?</p> <p>x = signs and missing numbers Continue using a range of equations as in year 2 but with appropriate numbers.</p> <p> $7 \times 4 = \square$ $\square = 4 \times 7$ $7 \times \square = 28$ $28 = \square \times 7$ $\square \times 2 = 28$ $28 = 2 \times \square$ $\square \times \nabla = 28$ $28 = \square \times \nabla$ </p> <p>Pupils can be introduced to the model "4 for the price 1"</p>	<p>Pupils are introduced to the columnar method of multiplication in its compact form. This can reflect the times table facts that the children have learnt to date:</p> <p>24 x 4</p> $\begin{array}{r} 24 \\ \times 4 \\ \hline 96 \\ \hline 1 \end{array}$ <p>Pupils then progress onto multiplying three digit numbers by a one digit number (short multiplication)</p> <p>123 x 4</p> $\begin{array}{r} 123 \\ \times 4 \\ \hline 492 \\ \hline 1 \end{array}$



Multiplication - Year 4

Mental methods	Formal written methods
<p><u>Multiplication facts</u> Pupils should <u>consolidate</u> understanding of multiplication and division facts from 2,3,4,5, 8 and 10 times tables and <u>learn</u>, the multiplication and division facts from 6,7,9,11,12 times tables using a variety of language to describe the operation used:</p> <p>What is 11 <u>times</u> 4? What is 11 <u>groups of</u> 4? What is 11 <u>lots of</u> 4?</p> <p>How many 4s <u>are there in</u> 44? What is 44 <u>shared</u> between 4?</p> <p>x = signs and missing numbers Continue using a range of equations as in year 2 but with appropriate numbers.</p> <p>11 x 4 = □ □ = 4 x 11 11 x □ = 44 44 = □ x 4 □ x 11 = 44 44 = 4 x □ □ x ▽ = 44 44 = □ x ▽</p> <p><u>Partitioning</u> Partitioning to solve problems that involve multiplying a one digit number by a two digit number:</p> <p>16 x 4 = (10x4) + (6x4) 40 + 24 = 64</p>	<p>Pupils should use the columnar method of multiplication to solve problems involving multiplying a one digit number by a three-digit number.</p> $\begin{array}{r} 237 \\ \times \quad 6 \\ \hline 1422 \\ \quad 24 \\ \hline \end{array}$ <p>They can then progress onto multiplying a one-digit number by a four-digit number.</p> $\begin{array}{r} 1479 \\ \times \quad 7 \\ \hline 10353 \\ \quad 356 \\ \hline \end{array}$ <p>When performing the short multiplication calculations pupils will focus mainly on multiplying by 6, 7, 9 to consolidate knowledge of times tables.</p>



Multiplication - Year 5

Mental methods	Formal written methods
<p><u>Multiplication facts</u> Pupils should regularly practise multiplication and division facts for all tables up to 12 x 12.</p> <p><u>Partitioning</u> Partitioning to solve problems that involve multiplying a one digit number by a three digit number:</p> $168 \times 4 = (100 \times 4) + (60 \times 4) + (8 \times 4)$ $= 400 + 240 + 32$ $= 672$ <p><u>Square numbers</u> Pupils should be introduced to the notation for squared numbers and know the square numbers up to 12 x 12 and be able to recall these quickly.</p> <p><u>X and ÷ by 10, 100 and 1000</u> Pupils will X and ÷ whole numbers by 10, 100 and 1000. For example:</p> $37 \div 10 = 3.7$ $37 \div 100 = 0.37$ $37 \times 10 = 370$ $37 \times 100 = 3700$ <p>Pupils will multiply proper fractions by a whole number:</p> $\frac{3}{5} \times 4 = \frac{3 \times 4}{5} = \frac{12}{5} = 2\frac{2}{5}$ <p>Pupils will multiply mixed numbers by whole numbers</p> $1\frac{2}{3} \times 4 = \frac{5}{3} \times 4 = \frac{5 \times 4}{3} = \frac{20}{3}$ $= 6\frac{2}{3}$	<p>Pupils should progress to using the columnar method for multiplying a two digit number by a two digit number:</p> $18 \times 16 =$ $\begin{array}{r} 18 \\ \times 16 \\ \hline 108 \\ + 180 \\ \hline 288 \end{array}$ <p>They can then progress to a two digit number multiplied by a three digit number:</p> $234 \times 16 =$ $\begin{array}{r} 234 \\ \times 16 \\ \hline 1404 \\ + 2340 \\ \hline 3744 \end{array}$


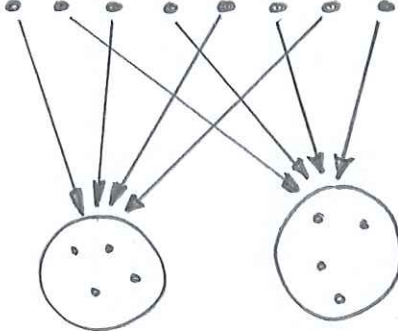
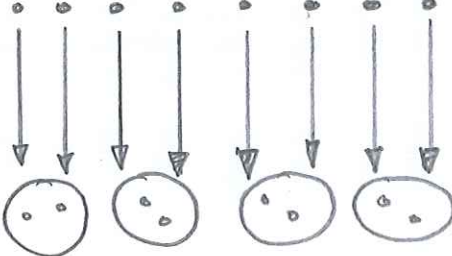


Multiplication – Year 6

Mental methods	Formal written methods
<p><u>Multiplication facts</u> Pupils should regularly practise multiplication and division facts for all tables up to 12 x 12.</p> <p>They should be mentally able to use these facts to solve problems like:</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>60 x 4</p> <p>6 x 4 = 24, but 60 is ten times bigger than 6, so my answer should be ten times bigger than 24.</p> </div> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>2.4 ÷ 6</p> <p>24 ÷ 6 = 4, but 2.4 is ten times smaller than 24, so my answer should be ten times smaller than 4.</p> </div> <p><u>Square numbers and further work:</u> Pupils should be taught that:</p> <p>$6^3 = 6 \times 6 \times 6 = 216$</p> <p><u>Problem solving</u> Recognise that the cost of three games at £2.99 each can be solved by:</p> <p>£3 x 3 = 9 Subtract 3 x 1p = 3p Total £2.97</p> <p><u>Order of operations</u> Pupils will solve calculations that involve a number of operations and use the order of operations to solve the problems:</p> <p>$3 + 9 \times 6 = 57$ (multiplication calculation carried out before addition)</p>	<p>Pupils should be fluent at solving calculation that involve a two digit number multiplied by a number up to four digits long.</p> <p>2356 x 26 =</p> $ \begin{array}{r} 2356 \\ \times 26 \\ \hline 14136 \\ 47120 \\ \hline 61256 \end{array} $ <p>Pupils should be able to multiply a one digit number by a number with up to two decimal places:</p> <p>3 x 4.12</p> $ \begin{array}{r} 4.12 \\ \times 3 \\ \hline 12.36 \end{array} $

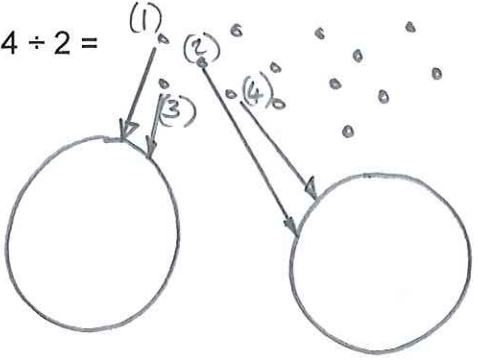


Division – Year 1

Mental methods	Formal written methods
<p data-bbox="209 367 561 405"><u>Pictures / marks</u></p> <p data-bbox="209 412 790 539">12 children get into teams of 4 to play a game. How many teams are there?</p> 	<p data-bbox="820 367 1300 577">Pupils can record answers to problems involving division through the use of pictures, arrays or use of practical equipment.</p> <p data-bbox="820 622 1334 750">There are two types of division: eight sweets divided by four sweets equals two (Type 1)</p>  <p data-bbox="820 1265 1326 1348">or Eight sweets divided by four equals two sweets (Type 2)</p> 



Division – Year 2

Mental methods	Formal written methods								
<p><u>Multiplication facts</u> Pupils should learn multiplication and division facts form 2, 5 and 10 times tables using a variety of language to describe the operation used.</p> <p>What is 5 times 4? What is 5 groups of 4? What is 5 lots of 4?</p> <p>How many 4s are there in 20? What is 20 shared between 4?</p> <p><u>÷ = signs and missing numbers</u></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">$6 \div 2 = \square$</td> <td style="width: 50%;">$\square = 6 \div 2$</td> </tr> <tr> <td>$6 \div \square = 3$</td> <td>$3 = 6 \div \square$</td> </tr> <tr> <td>$\square \div 2 = 3$</td> <td>$3 = \square \div 2$</td> </tr> <tr> <td>$\square \div \nabla = 3$</td> <td>$3 = \square \div \nabla$</td> </tr> </table>	$6 \div 2 = \square$	$\square = 6 \div 2$	$6 \div \square = 3$	$3 = 6 \div \square$	$\square \div 2 = 3$	$3 = \square \div 2$	$\square \div \nabla = 3$	$3 = \square \div \nabla$	<p>Horizontal division problems can be solved using knowledge of multiplication facts, physical materials, arrays or pictures.</p> <p>$20 \div 5 = 1$ know $4 \times 5 = 20$ So $20 \div 5 = 4$</p> <p>$14 \div 2 =$</p>  <p>I have 14... , I put one in the first circle, then another in the second circle. Then I put another in the first circle and another in the second circle until I have none left.</p>
$6 \div 2 = \square$	$\square = 6 \div 2$								
$6 \div \square = 3$	$3 = 6 \div \square$								
$\square \div 2 = 3$	$3 = \square \div 2$								
$\square \div \nabla = 3$	$3 = \square \div \nabla$								



Division - Year 3

Mental methods	Formal written methods
<p><u>Multiplication facts</u> Pupils should <u>consolidate</u> understanding of multiplication and division facts from 2, 5 and 10 times tables using a variety of language to describe the operation used.</p> <p>Pupils should be <u>introduced to</u>, and <u>learn</u>, the multiplication and division facts from 3, 4 and 8 times tables using a variety of language to describe the operation used.</p> <p>What is 8 times 4? What is 8 groups of 4? What is 8 lots of 4?</p> <p>How many 4s are there in 32? What is 32 shared between 4?</p> <p>x = signs and missing numbers Continue using a range of equations as in year 2 but with appropriate numbers.</p> <p> $9 \div 3 = \square$ $\square = 9 \div 3$ $9 \div \square = 3$ $3 = 9 \div \square$ $\square \div 3 = 3$ $3 = \square \div 3$ $\square \div \nabla = 3$ $3 = \square \div \nabla$ </p>	<p>Pupils should divide two digit numbers by one digit where there is no remainder, using numbers in their times tables. This should be set out using the "bus stop" method of division. The two digit number can be one that is outside of their times table knowledge.</p> <p>$63 \div 3 =$</p> <div style="text-align: center;"> $\begin{array}{r} 21 \\ 3 \overline{) 63} \end{array}$ </div> <p>"How many 3's are there in 6?"</p> <p>How many 3s are there in 3: answer-one".</p>



Division - Year 4

Mental methods	Formal written methods
<p><u>Multiplication facts</u> Pupils should <u>consolidate</u> understanding of multiplication and division facts from 2,3,4,5, 8 and 10 times tables using a variety of language to describe the operation used.</p> <p>Pupils should be <u>introduced to</u>, and <u>learn</u>, the multiplication and division facts from 6,7,9,11,12 times tables using a variety of language to describe the operation used.</p> <p>What is 11 times 4? What is 11 groups of 4? What is 11 lots of 4?</p> <p>How many 4s are there in 44? What is 44 shared between 4?</p> <p>x = signs and missing numbers Continue using a range of equations as in year 2 but with appropriate numbers.</p> <p>$11 \times 4 = \square$ $\square = 4 \times 11$ $11 \times \square = 44$ $44 = \square \times 4$ $\square \times 11 = 44$ $44 = 4 \times \square$ $\square \times \nabla = 44$ $44 = \square \times \nabla$</p> <p>x = signs and missing numbers Continue using a range of equations as in year 3 but with appropriate numbers.</p> <p>$9 \div 3 = \square$ $\square = 9 \div 3$ $9 \div \square = 3$ $3 = 9 \div \square$ $\square \div 3 = 3$ $3 = \square \div 3$ $\square \div \nabla = 3$ $3 = \square \div \nabla$</p>	<p>Pupils can progress to dividing a three digit number by a one digit number without remainders but that involves "carrying": $108 \div 4$:</p> $\begin{array}{r} 027 \\ 4 \overline{) 108} \end{array}$ <p>Answer: 27</p> <p>Pupils can progress to dividing a three digit number by a one digit number with remainders: $117 \div 5$</p> $\begin{array}{r} 023 \text{ r}2 \\ 5 \overline{) 117} \end{array}$ <p>Answer 23^{r2}</p>



Division - Year 5

Mental methods	Formal written methods
<p><u>Multiplication facts</u> Pupils should regularly practise multiplication and <u>division</u> facts for all tables up to 12 x 12.</p> <p>"How many 6's are there in 24?" "How many 9's are there in 81?"</p> <p>Pupils should be able to divide and multiply decimals by 10, 100 and 1000.</p>	<p>Pupils use the bus stop method to divide numbers with up to four digits by a one digit number:</p> $1278 \div 3 = \begin{array}{r} 0426 \\ 3 \overline{) 1278} \\ \underline{3} \\ 07 \\ \underline{6} \\ 17 \\ \underline{15} \\ 28 \\ \underline{27} \\ 18 \\ \underline{18} \\ 0 \end{array}$ <p>Answer 426</p> <p>And apply the division method to problems that involve rounding up or down:</p> <p>"There are 123 eggs. Each egg box holds 6 eggs. How many <u>full</u> boxes of eggs can I make?" Answer: $123 \div 6 = 20r3$, so I can make 20 full boxes of eggs.</p> <p>Pupils should be introduced to the long division method in its compact form by writing the times tables up to 10 x the divisor and then using this to help them find out, for example, how many 13s there are in 256 (see example below).</p> $253 \div 13$ <p> $1 \times 13 = 13$ $2 \times 13 = 26$ $3 \times 13 = 39$ $4 \times 13 = 52$ $5 \times 13 = 65$ $6 \times 13 = 78$ $7 \times 13 = 91$ $8 \times 13 = 104$ $9 \times 13 = 117$ $10 \times 13 = 130$ </p> <p>} use facts to check that $10 \times 13 = 130$</p> $\begin{array}{r} 019r9 \\ 13 \overline{) 2256} \\ \underline{13} \\ 95 \\ \underline{79} \\ 166 \\ \underline{157} \\ 96 \\ \underline{91} \\ 56 \\ \underline{51} \\ 56 \\ \underline{51} \\ 5 \end{array}$ <p>"13 into 25 is 1 remainder 12"</p>



Division – Year 6

Mental methods	Formal written methods
<p><u>Multiplication facts</u> Pupils should regularly practise <u>multiplication</u> and <u>division</u> facts for all tables up to 12 x 12 and be fluent in recalling these facts.</p>	<p>Pupils should continue to use the long division method in its compact form by writing the times tables up to 10 x the divisor and write the answer as either a remainder or a fraction:</p> $236 \div 13$ $13 \times 1 = 13$ $13 \times 2 = 26$ $13 \times 3 = 39$ $13 \times 4 = 52$ $13 \times 5 = 65$ $13 \times 6 = 78$ $13 \times 7 = 91$ $13 \times 8 = 104$ $13 \times 9 = 117$ $13 \times 10 = 130$ $13 \overline{) 223^1 0^6} \begin{matrix} 0 & 1 & 8 & r2 \end{matrix}$ <p>Answer 18^{r2}</p> <p>Pupils should use short division method to find answers to two decimal places:</p> $125 \div 4$ $4 \overline{) 125.00} \begin{matrix} 03 & 1. & 25 \end{matrix}$ <p>Answer 31.25</p> <p>Pupils should divide proper fractions by whole numbers:</p> $\frac{1}{3} \div 2 = \frac{1}{6}$